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Environmental Education in Oman: Exploring the Factors
Determining Students' Self-Reported Environmental Attitudes
and Behaviours toward Environmental Issues.

A Dissertation Submitted to the Faculty of Health and Life
Sciences of the University Of Northumbria in Partial Fulfilment
of Requirements for the Degree of Doctor of Philosophy

BY

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Principal Supervisor: Dr. Sean McCusker

Second Supervisor: Dr. Mike Cassidy

January 2020

ABSTRACT

The objective of this research is to consider self-reported environmental attitudes and behaviours of Omani students and identify the factors that determine them. The aim of this research is to explore the current environmental education curriculum in Oman. Specifically, this research is designed to: 1) survey Omani students' attitudes and behaviours toward environmental issues; 2) identify school-related factors that might influence Omani students' self-reported environmental attitudes and behaviours.

A research design of explanatory sequential mixed methodology is adopted in order to gather the information from primary and secondary sources. An instrument of 53 items was designed and tested on 212 students from four secondary schools in Oman. This was followed by 25 semi-structured interviews with students, teachers and heads from the same four secondary schools.

The data generated from the questionnaires have been analysed using two methods: 1) descriptive statistics and cross-tabulation tests; 2) principle components analysis using factor analysis. The data generated from the interviews have been analysed using thematic analysis.

Findings indicate that educational level and gender have a strong relationship with environmental knowledge, attitudes and behaviour. There was a significant relationship between gender and environmental knowledge scores, with males receiving higher scores than females. There was a significant relationship between school educational level and environmental attitudes and behaviours scores as well, with higher levels of school education receiving slightly higher environmental attitudes and behaviours scores than those from lower levels of school education.

Environmental curriculum and school mission appear to be moderate contributors to environmental attitudes and behaviours, whereas, environmental knowledge appears to be a slight positive contributor to environmental attitudes and behaviours. Overall, the result of this study suggests that including environmental items in schools' missions improved students' environmental knowledge, attitudes and behaviours.

ACKNOWLEDGMENT

The completion of this thesis has been part of my commitment to lifelong learning. This PhD programme was a challenging, but the benefits are of use both to my own professional development and furthering Arabic literature on environmental education. I have gained a great deal, which will help me both personally and professionally for the rest of my life. First and foremost, my sincerest thanks and gratitude goes to God for providing me with the means and perseverance to complete this journey. Without His will and generosity, none of this or any other accomplishment would have been possible. I am grateful and extremely thankful to Dr. Sean McCusker, my principal supervisor, and Dr. Mike Cassidy, my second supervisor, for sharing expertise, sincere and valuable guidance, and encouragement extended to me. Many thanks, Dr. Sean McCusker and Dr. Mike Cassidy for your invaluable advice, inspirational support, and encouragement, as well as your patience in respect to my shortcomings. I would also like to express my gratitude to my fellow PhD students who have helped me and given me constructive comments during this journey. I also place on record, my sense of gratitude to one and all, who directly or indirectly, have lent their hand in this research.

DECLARATION

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others. The work was done in collaboration with Principal Supervisor Dr. Sean McCusker and Second Supervisor Dr. Mike Cassidy.

Any ethical clearance for the research presented in this thesis has been approved. Approval has been sought and granted by the Faculty Ethics Committee / University Ethics Committee in September 2017 and *Ministry of education in Oman/ Research Department* on 11 April 2018.

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Environmental Education in Oman: Exploring the Factors
Determining Students' Self-Reported Environmental Attitudes
and Behaviours toward Environmental Issues

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CHAPTER 1: INTRODUCTION

1.1 Chapter Overview

This chapter aims to provide background information about environmental education (EE) and the significance of mixed methods research in this study. This chapter concludes with the articulation of aims, objectives, research questions, and research terminology.

1.2 Introduction

There is strong scientific consensus that current environmental issues, such as global warming, natural resource depletion and climate change, impose extreme threats on this planet, and now is the time to raise awareness and take necessary action about those threats (Abdul-Wahab et al., 2015; Chang and Kidman, 2018; Choudri et al., 2016; Drews and Van den Bergh, 2016). Environmental issues have become a significant area of concern to people around the world. Lives of people have been negatively affected by environmental pollution. Many studies have reported the consequences of global warming, which are wide scale, enduring, overarching, and threatening to humanity and social well-being (IPCC, 2001; 2007).

Some possible effects of global warming on Arab nations in general and Oman in particular have been reported in previous studies (Wong et al., 2018). For instance, the Middle Eastern region is most vulnerable to the impact of climate change, including declines in global food production, threats to human health and loss of biodiversity (Mansour et al., 2018; Harding et al., 2018). Moreover, water resources are affected by climate change in Oman and it is reported that the country will also face an ongoing biodiversity reduction (Eso.org.om, 2019).

The responsibility to reduce greenhouse gases, and to address and raise awareness about other environmental problems lies in the hands of governments, corporations, communities,

and individuals (SustainableOman, 2018). As a result, action toward reducing the effects of global warming have been addressed through the introduction of policies, for instance, the implementation of the policy designed to reduce emissions of carbon dioxide and other greenhouse gases (Drews and Van den Bergh, 2016). It is also necessary to persuade individuals to reduce their contributions to greenhouse gases and promote eco-friendly actions (Geyer et al., 2016). Several strategies have been employed to increase public awareness regarding environmental issues to reduce pollution (Zafar, 2016; 2019). One of these strategies is harnessing the power of sustainable education at schools (Mulà & Tilbury, 2011; Bokova, 2011). This strategy has been adopted with the view that schools can help build a positive image and nurture positive attitudes among students for the conservation of the environment.

Sustainable Development Goals (SDGs) provide a framework through which every country can achieve sustainable development. The indicators provided in the SDG framework aim for continuous development while maintaining the welfare of people. Education is also an indicator within this framework, and is supposed to be the main objective to address these problems, as education and schools are a source of influence and a gateway to knowledge (Hedefalk et al., 2015; Kopnina, 2012). Therefore, introducing and developing a curriculum for students that enhances students' awareness of the environment is a critical success factor for conservation (Al Jabri et al., 2018). Al-Ani (2017) and Geyer et al. (2016) emphasised that environmental education will encourage learners to behave in an eco-friendly manner and consider the pressing need to reduce waste and its impacts on the environment. Furthermore, raising learners' awareness of environmental issues is considered an essential prerequisite for actions taken for environmental conservation (Al-Ani, 2017; Zafar, 2019). Consequently, environmental education, both formal and informal, is an essential weapon in the fight against environmental degradation.

Thus, researchers have investigated the effect of environmental education in changing the individuals' behaviour (Zafar, 2019; De Leeuw et al., 2015). Curriculum developers and educational experts have recognised the importance of developing an environmental curriculum that covers different educational stages. Various researchers have identified that there is a significant relationship between the occurrence of scientific knowledge and attitudes towards the exploitation of the environment (Al-Balushi and Al-Aamri, 2014). Zafar (2016) and Dal et al. (2015) have asserted that the actions of students to reduce environmental exploitation would increase after the attainment of knowledge concerning environmental degradation.

Karimi (2019) stated that attitudes nurtured at an early age last longer than those learned at a later age; students who learn at an early age are likely to develop durable positive attitudes towards saving the environment. By measuring environmental attitudes of students, Runhaar et al. (2019) highlighted that differences in attitudes are seen between students at different educational levels. However, this current study is aimed at identifying the environmental attitudes of students belonging to higher secondary grade. It is assumed that taking higher secondary grade students as the subject of this investigation will enable the researcher to have a better understanding of the phenomenon (Wong et al., 2018).

Since 2007, before the establishment of the Ministry of Environment and Climate Affairs (MECA), environmental strategies of Oman had experienced many developments. Royal decree (no 91/2007) was intended for the establishment of MECA. In the Sultanate of Oman, MECA is the prime body for maintaining environmental conservation and formulating strategies for it. This includes giving licences to companies for their operational activities, monitoring different industries and businesses, and giving clearances (MECA, 2019). MECA's mission is:

“We do our best to protect the environment and conservation of natural resources by providing all the means available to ensure the provision of high-quality services” (MECA, 2016, p.1).

The Environment Society of Oman (ESO) is raising awareness of factors contributing to environmental degradation and possible solutions to address these factors. The two areas of concern for the Omani government are environmental protection and waste management, for which the private sector is striving hard. Be’ah, environment services of Oman, was established in 2009 as a private company as per the royal decree (no 46/2009). Be’ah charter states that it has the prime responsibility of managing liquid and solid waste, along with the management of sanitary landfills (Be’ah, 2017). The natural environment of Oman was severely damaged in 2007 and 2010 when it was impacted by high-intensity hurricanes. Since then, governments started initiatives for the protection of the environment, and the media started to pay attention as well. Environmental sciences were introduced as a subject by the Ministry of Education (MOE). The subject was framed for students in grade 12, focusing on the literature covering the environment and society. Research was carried out in Oman to identify the topics that should be included in the course, such as, science, culture and environment, and technology (Mansour and Al-Shamrani, 2015).

Environmental conservation is the first challenge encompassing many nations, including Oman. A background understanding of these challenges makes individuals well-versed with the problem and enables them to address it thoroughly. Additionally, the attitudes and behaviours of individuals towards the environment are contributing factors for solving the stated problem. There is limited literature available on the practice of citizens of Gulf Cooperation Council (GCC) countries regarding the exploitation of environmental resources. Hence, the fundamental goal of this study is to investigate the self-reported environmental attitudes of Omani students and the factors that determine their views.

1.3 Research Problem

Environmental conservation has emerged as an essential point of concern in the world. As a result, there has been more emphasis on the role of political engagement in relation to the environment. In other words, the actions of some stakeholders, such as the MOE and MECA, to address environmental challenges are essential. The escalating rates of pollution and the decline in the conservation of natural resources has emerged as a significant cause of concern (Al-Najar, 2016; Clayton and Myers, 2015; Drews and Van den Bergh, 2016). However, adverse environmental practices are evident in society, such as ecosystem pollution and urban sprawl. There is an increasing interest in understanding the level of awareness among individuals with regards to environmental issues as questions have been raised concerning the amount of environmental education.

Attitudes and behaviours towards environmental issues are contingent on the ability of people to distinguish between good and bad environmental practices (Sengupta et al., 2010). Therefore, this investigation seeks to gain a better understanding of the self-reported environmental attitudes and behaviours of students in Omani secondary schools and outside. Also, it evaluates factors within the school that may influence these behaviours. Within industrialised society, the challenge of environmental pollution has emerged as a multifaceted factor that challenges the existing relationships between humanity and the ecosystem (Al-Maamari et al., 2014). However, the ability of individuals to adapt to change in the environment relies heavily on the perceived benefits they gain. Through environmental education, there is better communication between different stakeholders concerned with controlling and imposing regulations on environmental pollution.

This form of behaviour is motivated by intentions that are influenced by attitudes, which are transformed into positive actions towards the conservation of the environment. Responsible environmental practices are shaped by the extent to which the individual believes

that their behaviour impacts positively on society, thus gaining inner satisfaction for their actions (Leal Filho, 2015). In the current study, an evaluation of attitude and practices of secondary school students with regards to the environment helps to paint a picture of how some pro-environmental attitudes can be developed. It is the fundamental rationale as to why the current study is to be conducted. The findings of this study will help inform policymakers to develop better curricula within schools, which will consider environmental issues. The findings will also explain the attitudes and behaviours of students within and outside Omani secondary schools.

However, it is necessary that a conceptual framework is developed for assessing the environment-friendly behaviours of students for a comprehensive understanding of motivational factors that could support the development of pro-environmental behaviour. Attitudes have a significant role and contribute largely by shaping the willingness of students to demonstrate positive and pro-environmental behaviour. As a result, by considering attitudes as a significant determinant of behaviour, the study allows the development of a better understanding with regards to changes in lifestyle to address the needs of the environment.

1.4 Research Theory

A theoretical framework is pivotal for a better conceptualisation of environmental attitudes and behaviours, as a conceptual framework facilitates understanding of the causes of the different behaviours, while the theory of behaviour is vital for shedding light on behavioural patterns towards society and ecology (Wong et al., 2018). The Responsible Environmental Behaviour (REB) model of Hines et al. (1987) describes the journey from knowledge to behaviours. It evaluates whether awareness, education, intention, and attitude transform into action or not. For this purpose, the REB theory is used as an epistemological research position (Hines et al., 1987). REB explains that knowledge, intentions, and attitudes are behavioural

dispositions, and these behavioural dispositions are irrelevant to the real world unless they translate into action (reality). Moreover, the model considers that intentions play a central role in motivating and impacting behaviour.

Consequently, they remain as behavioural disposition until the opportunity arises when the intention can be translated into action. The truth about an individual's environmental position can only be determined based on real actions and not intentions. Thus, REB implements the general philosophical framework of pragmatism, since pragmatism focuses on acts as a means to understand the world. Pragmatism is about practicality; the outcome is what matters, and truth can be distinguished based on actual results and outcomes (De Leeuw et al., 2015; Blok et al., 2015; Clayton and Myers, 2015; Hines et al., 1987; Munang et al., 2013). Since the researcher is trying to investigate the actual consequences of environmental education in schools in Oman, pragmatism is the most suitable methodology.

According to the REB model, increasing knowledge among individuals translates to more sympathetic attitudes that promote appropriate environmentally friendly actions. As a result, greater access to the natural environment is primarily linked to increased sensitivity and awareness of individuals (Al-Najar, 2016; Cronk, 2016; Sawitri et al., 2015). Additionally, through creating awareness, an environmental ethic is developed, which creates an intrinsic motivation for conserving energy and reducing negative effects on the environment. Hines et al. (1987) stated that it could be determined that many psycho-social variables are affiliated with REB. The factors include: expressed intention, personal responsibility, locus of control, attitudes and knowledge, in order of decreasing strength.

1.5 Significance of the Study

There are limited studies available on the subject of environmental education in the context of Oman (Ambusaidi and AL-Rabaani, 2009; Ambusaidi et.al, 2012 and Abdul-

Wahab, 2008). The available studies have mainly focused on developed countries, therefore, the lack of available literature focused on developing countries has made this study significant for developing countries so that they can focus on environmental well-being and conservation through education (Abdul-Wahab et al., 2003; Abdul-Wahab, 2008; Taylor et al., 2014). However, these studies have been conducted in different settings or with different types of samples. This study will be the first that explores this issue in Oman. The topic of environmental problems is a sensitive one in oil-producing countries because it represents the conflict between politicians and educationalists. Politicians in these countries are more concerned about economic benefits whereas educationalists are concerned more with increasing the awareness of these issues among students and the young generation.

Additionally, this research will contribute to the existing literature by exploring factors in schools responsible for self-reported attitudes of students towards the environment. Factors that are going to be investigated in this study have not been explored before in Oman. The environmental knowledge factor has been explored in Switzerland (Freeman et al., 2014). Environmental education factors have been investigated in different countries, such as England and Denmark (Al-Najar, 2016; Al-Maamari, 2014; Breiting and Wickenberg, 2010; Stokes et al., 2001). According to the literature, the school mission factor has been investigated in Mexican and English schools (Breiting and Wickenberg, 2010; Stokes et al., 2001; Barraza, 2001; Barraza and Walford 2002). This study will also help to influence the policy-setting by the government of Oman to have better rules and regulations to protect the environment.

A couple of notable recommendations based on this investigation would be suggested to the MOE of Oman for a curriculum designed for conservation of the environment. It will be done by taking some necessary steps which are:

- 1- To review schools' environmental education curriculum to improve students' behaviours toward environmental issues.

- 2- To introduce improved and innovative training for teachers dedicated to environmental teaching in schools.
- 3- To introduce methods for personal development of teachers.
- 4- To influence policy-setting by the government of Oman to consider the environmental issues by issuing new rules and regulations to protect the environment.

1.6 Research Aims

The aims of this investigation are:

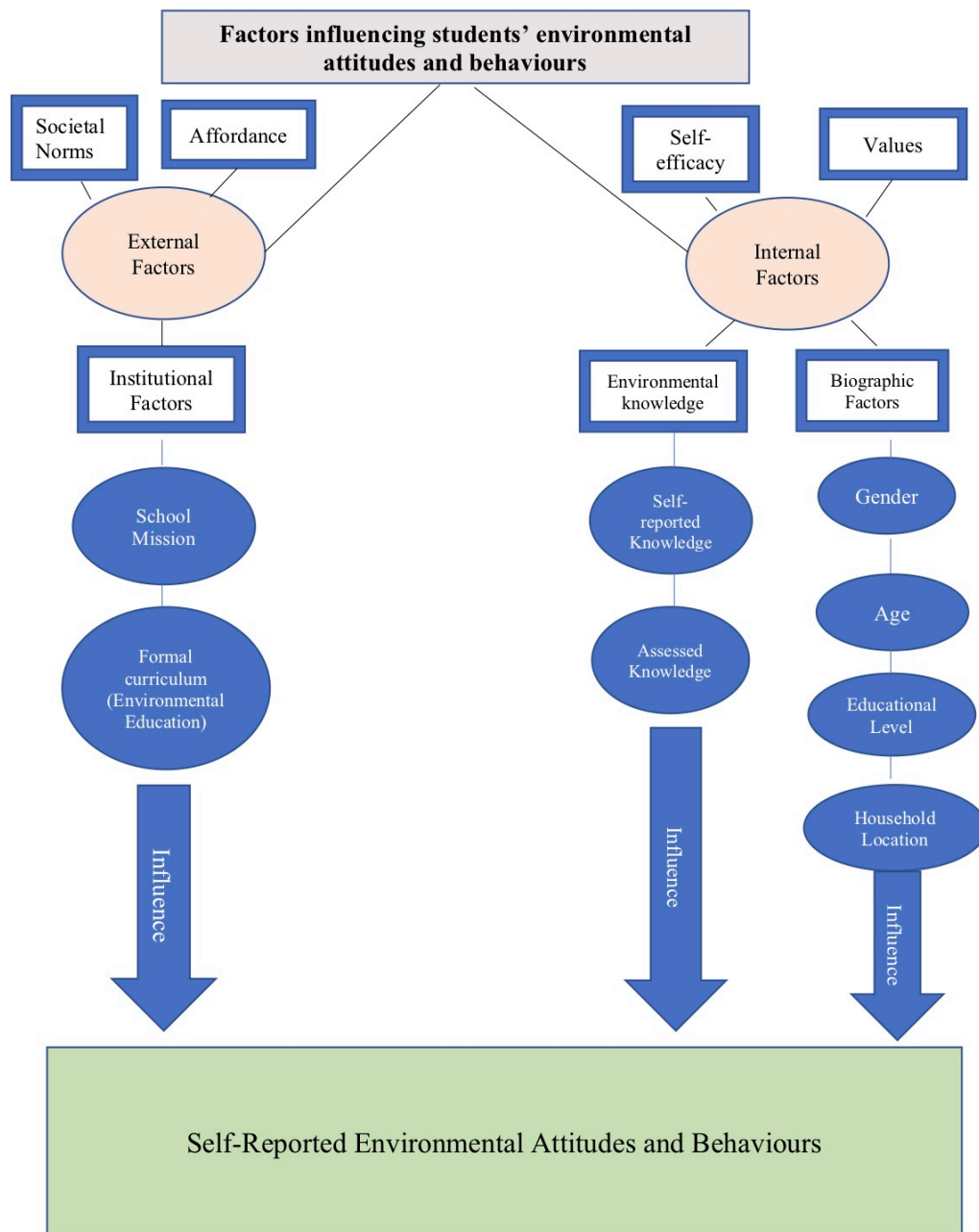
1. To explore the attitudes and behaviours of Omani students towards environmental conservation.
2. To highlight the school factors that contribute to impacting the self-reported environmental attitudes and behaviours of students.
3. To inform curriculum developers within Oman regarding the school factors and their influence on self-reported environmental attitudes and behaviours.

1.7 Research Questions

Based on the aims of this investigation, the research will answer the following questions so that exploration of self-reported attitudes and behaviours of Omani students can be made possible.

1. What are the attitudes and behavioural patterns of Omani students towards the environment?
2. What are school factors that influence students' self-reported environmental attitudes and behaviours?

1.8 Current Research Model



Summary model representing research objectives in the current thesis

Figure 1.1: Factors influencing students' environmental self-reported attitudes and behaviours

1.9 Terminology

1. Pro-environmental behaviours (PEBs): behaviours aimed at minimising the negative impact on the environment caused by one's actions.
2. Workplace sustainability programmes (WSPs): these are aimed at making the environment of offices green by reducing carbon usage and encouraging suppliers to do the same.
3. Environmental attitude: the attitudes and concerns of a citizen towards the environment, which may be in favour of or against natural environmental settings.
4. Environmental behaviour: the habits of individuals that continue for a long time, thus transform into behaviour. The behaviour concerning ecology is environmental behaviour.
5. Environmental knowledge: the information and cognition that an individual has developed over time, related to the issues impacting the sustainability of the environment.

1.10 Summary

This chapter has given a brief overview of environmental issues facing the world collectively and Oman individually. It also presents the value of environmental education and provides the rationale for conducting this study. Also, it has outlined the research aims and, based on these aims, the study has generated some questions for which the researcher will seek answers in this research. The chapter concluded with the list of terminology that will be used throughout this thesis. The next section will provide a background of the education system in Oman and develop some themes relating to environmental education in Oman.

CHAPTER 2: BACKGROUND INFORMATION ON OMAN'S EDUCATION SYSTEM

2.1 Chapter Overview

A set of principles governs the education system in Oman, and the sources of these legal principles come from Islam and the verdict of the Sultan. The Islamic injunctions shape the legal framework because, being an Islamic state, Oman is governed under Islamic laws and teachings. In other words, society is based on the ideology and beliefs of Islamic teachings and the behaviours of citizens are assessed under these teachings as being right or wrong. According to this belief, the supreme power belongs to Almighty Allah, and the faith of people is shaped in this regard. They organised themselves, their families and society so that the behaviour of individuals can change according to these beliefs. Therefore, the development of civilisation and the attainment of scientific thinking and knowledge is based on Islam. As a result, education in the Sultanate of Oman is based on the values of Islam. Additionally, the education system can be changed or amended according to the statements given by His Majesty Sultan Qaboos bin Said. These are the directives that have improved the education system of the Sultanate of Oman so that human resources can be developed in a better way.

Furthermore, as per the beliefs of His Majesty, economic development is only possible when there are reforms in the education system continually as the need arises. Education is a continual process that demands rising standards from time to time according to changes in international education, so that students of one country can compete with students of another state on intellectual terms (Bruner, 2009). These reforms are necessary for the development of nations so that students can be equipped with the required skills and capacities to make them able to participate as the world changes. Similarly, the pronouncements given by His Majesty for continuous evaluation and improvement of education are vital for the development of educational policies at all levels. The field of education is, therefore, considered a significant

area of concern for the government of Oman, and Sultan Qaboos bin Said considered it as a priority right from the start of his reign in 1970. Immediately after His Majesty had taken the reins of government, he determined to establish a new process of education, and he stated:

“We will teach our children even under the shade of a tree” (Education Council, 2019).

As a result, the process of education in Oman witnessed significant development and improvement over the years. This chapter provides background information about the education system in Oman, environmental education, and Omani initiatives toward preserving the environment.

2.2 Education in Oman

Before the reign of His Majesty Sultan Qaboos bin Said, the education system in Oman used to give teaching about the recitation of the Qur'an through the “Kuttat” made up of a group of boys and girls. The Arabic language, which is the first, the official and the native language of Oman, was also taught through the process of “Kuttat”, along with mathematics, by a single teacher. It was conducted mostly in the mosque, houses, or under a tree with no particular location or schools (Wiseman et al., 2014). The actual process of education in Oman was started after 1970 (Al-Najar, 2016). Education in Oman has witnessed momentous change since 1970. This hierarchy by Al-Najar (2016), shown in Figure 2.1, explains the state of education before and after 1970. It can be seen in the figure that before 1970 there were only three schools, and they were only for boys. Females in Oman did not have the right to go to school before 1970 due to the traditions and culture that prevailed in Omani society before that time, when women did not have a role outside the household.

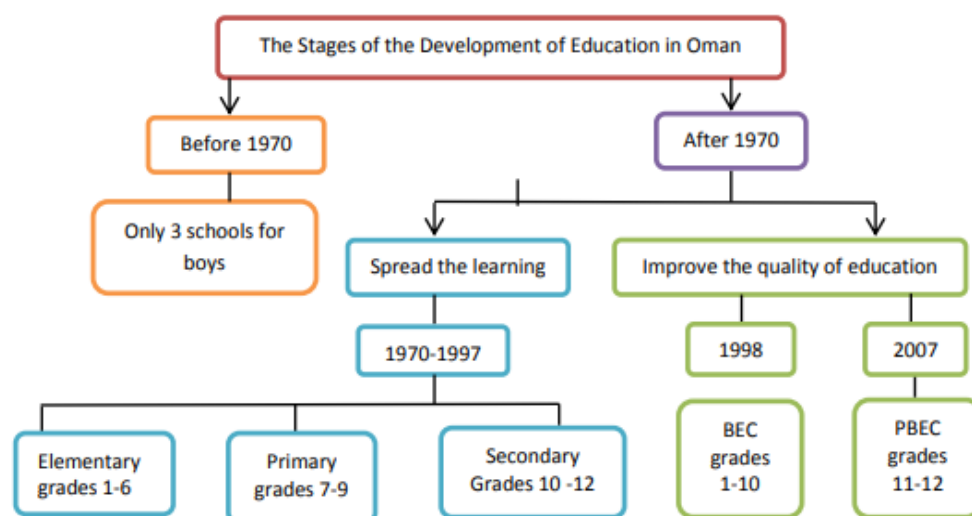


Figure 2.1: The stages of the development of education in Oman

Source: Al- Najar (2016, p.134)

Children in Oman, both girls and boys, have access to free education for the primary, middle and secondary levels, but seeking education in Oman is not compulsory. It is solely the decision of parents whether to enrol their children in schools or offer alternative forms of learning. However, education has not always been free and easily accessible in Oman. Before 1970, the education system consisted of Islamic studies taught in mosques and Quranic schools. Students learned about the doctrines and principles of the Islamic injunctions in these settings (Khan, 2013). The Sultanate by this time had three schools with about 900 enrolments. With such a low rate of admission of students in schools, the majority of the Omani population was illiterate. Sultan Qaboos was determined to change the status quo and raise awareness of the need for formal education about Islamic teachings and Arabic.

Accordingly, after 1970, the government began to develop the infrastructure and provided necessary items for students to encourage them to attend school. The provision included free transport, boarding facilities, meals, and uniforms for students belonging to

disadvantaged families (Issan and Gomaa, 2010). In addition to catering for the students' needs, the government trained and hired more teachers to teach the students. By the end of 1971 the number of schools had increased from 3 to 42, while the population of students increased from 900 to 15,000 (Ibid). According to Alshoaibi (2018), the state of the education system continued to change over time. Within 20 years, the number of students enrolled in schools had risen to 300,000 and the number of schools increased to 780. The government had hired more than 15,000 teachers to ensure that there were enough teachers in every school to provide quality education. By the year 2012, the enrolments in school were estimated to be 514,000 in more than 1,000 government schools (Khan, 2013). The figures do not account for the private schools that had also been increasing in number over the years.

When the transformation began in 1970, the number of teachers was around 30. The education system did not cater for girls or hire female teachers (Goveas and Aslam, 2011). The majority of teachers were male even in the first few years of the reform process. Consequently, more than 80% of women in Oman were illiterate (Oxford Business Group, 2019). The government hired expatriates in the 1970s to steer the education system forward and two training institutions were established in 1975 to recruit both male and female teachers. Part of the government's agenda while creating the new system was to educate women. In the first year alone, more than 1,000 female students were enrolled in schools. The percentage of girls among the students enrolled in all schools rose to approximately 49% by 2009 (Khan, 2013). Hence, the contribution of the government to the transformation of the education sector in Oman is evident. The government has not only multiplied the number of schools, teachers training colleges and staff members at an exponential rate but it has also made access to education free for all.

Oman, later on, realised that teachers, though they were few in number, contributed a lot in improving the system. The government perceived that teachers could support their agenda

of conservation of the environment by transforming the mind-set of students from anti-environment to pro-environment, cultivating the necessary skills and knowledge. Not only is environmental knowledge delivered to students, but teachers also develop economic relations that are closely linked with the environment. These efforts had made the MOE respond to development (Edwards, 2010). The response of the MOE was directed towards the technological development and with the directive of Sultan Qaboos, as per the needed growth in Oman, the Education Council formulated educational reforms. As a response to the directive of Sultan Qaboos, the MOE formed an education strategy, which runs until 2040, that laid down a robust structure to develop a wide range of programmes. It was geared towards adequately preparing students to confront the challenges they were facing by the ever-changing environment and achieving the national agenda of Oman (Al Nabhani, 2007).

Oman has experienced the contribution of teachers and the MOE has continued to upgrade and train more teachers, and build more schools and training colleges in an attempt to make education available to all (Al'Abri, 2011). The education system transformed Oman through the programmes that had been designed to provide learners with an awareness of the religious, social and legal obligations that provide a useful framework via which skills and competencies could be attained for sustainable development (Al-Issa and Al-Bulushi, 2012). The teachers in Oman have equipped the students with the faith of Allah as well as loyalty to their country. They made them realise that environmental conservation is a pressing issue for their country, and every student has to follow their faith, which suggests that they will be held accountable for every resource granted by Almighty Allah. The teachers encouraged the nation of Oman to acquire scientific skills and achieve sustainable development that went further to spearhead the growth of all sectors in Oman.

Some immense contributions to Oman are attributed to the educational improvement and preparation of learners by their teachers for the future demands of society. When Oman

came up with the statute as their main piece of legislation, education was considered the foundation upon which the community would derive its progress (Al' Abri, 2011). Schools were identified in Oman as the wheel upon which the development agenda of society flows; this involves improving standards, promoting scientific thought and research, and responding to economic and social plans. Oman witnessed the role of teachers in eradicating illiteracy and encouraging the establishment of more learning institutions.

2.3 The Structure of the Educational System

2.3.1 Educational Policy and Legislation

The responsibility of educational reforms is held by the MOE, which prepares plans and policies for the education sector. The MOE frames policies for the duration of the national development plan (NDP). The NDP lasts for five years and, after every five years, it is revised and amended as per the needs and indicators of development. The indicators of development are also determined by the ministry of growth and development in Oman. The NDP is not only focused on the achievement of objectives and goals, but it also provides the time frames and criteria that are required for the successful accomplishment of the objectives. There have been many different development plans intended to achieve the desired advances, especially in the field of education. The development plan is intended to be within a five year time frame, which is adequate to induce the right amount of development (MOE, 2001, p.4).

The administrative structure of the MOE has several authority levels. The top level of this hierarchy is situated within the capital city of the country of Oman. The second level or mid-level comprises the entire administrative element represented by the 11 educational directorates general distributed across the 11 states of the country. The third level is the school level, which functions as the principal administrative unit (MOE, 2001, p.3). See figure 2.2 for the MOE administrative structure:

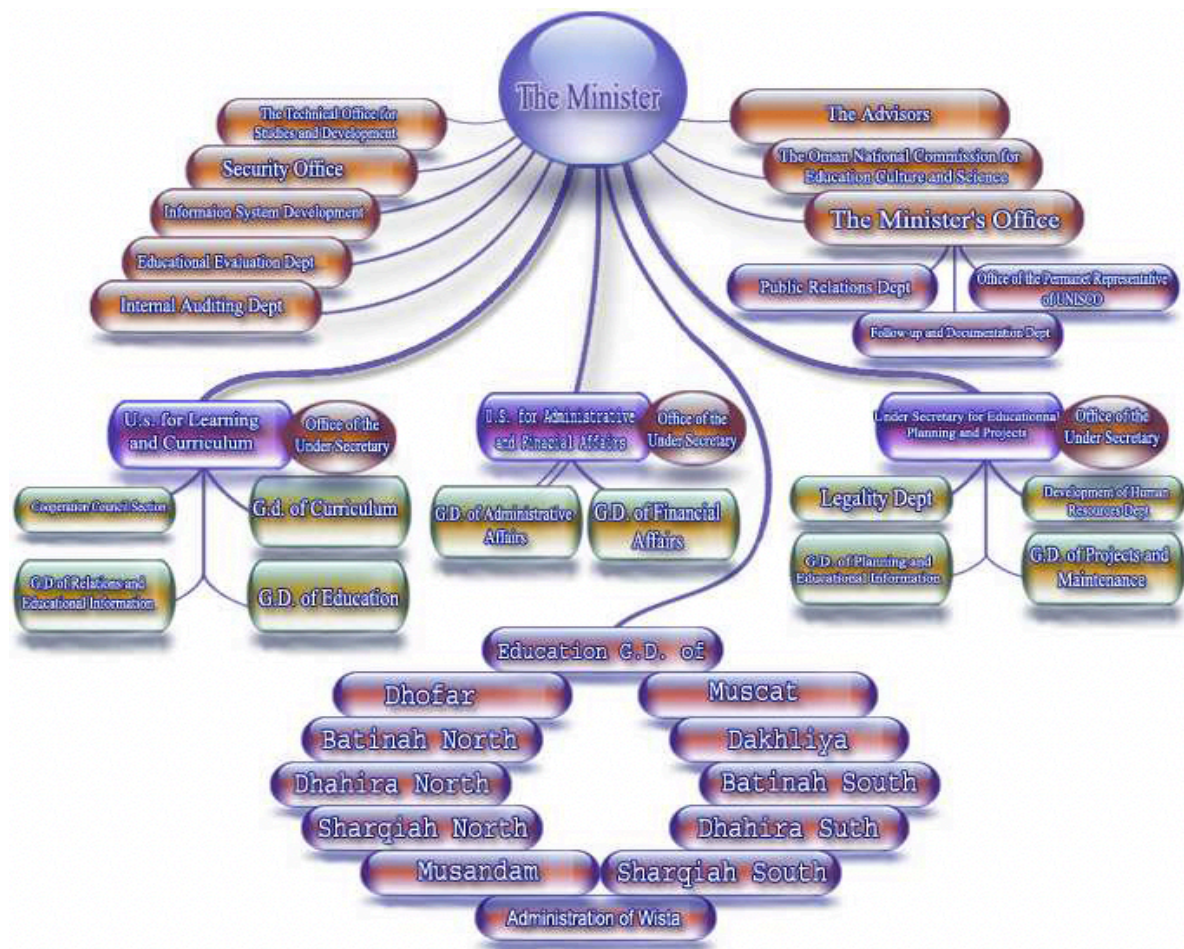


Figure 2.2: The administrative structure of the MOE (Ministry of Education)

Source: (www.moe.gov.om)

The MOE has the task of managing the entire educational system of the country, including the maintenance of educational standards for all the stages from grade 1 to grade 12 across the whole country. In addition, the MOE also has the authority as well as the duty to supervise all of the “special education” across the whole of the country.

This authority also extends to the quality of the overall educational programme as well as the management required for the teaching and support staff within all educational departments (MOE.gov.com, 2019). Adequate future planning is a critical element that is to be considered for the overall situation within the country.

Hence, the MOE has put particular emphasis on the ability to create a society that has significant economic and social development by ensuring that the educational standard, as well as the overall developmental progress of the whole country, is steered in a positive direction. The main aim of the MOE is to have the necessary buildings and resources for the students, and curricula suited to the overall purpose of education. It could be easily achieved using the "Oman digital society", which would help local society as well as the private sector to contribute in helping the country achieve better educational services (MOE.gov.com, 2019).

According to Education Council (2019) the Royal Decree No, 48 was issued in 2012 with the primary aim of establishing a governing body in the country of Oman that focuses on the educational standards of the country. The Education Council assists the country in achieving better standards that are synchronised with the overall vision as well as the wishes of His Majesty Sultan Qaboos bin Said, which can be used for the betterment and the enhancement of the overall educational system within the country in all forms and at all levels. These improvements can then have results aligned to the general policies of the state and the expected needs of the labour force that can be used in the future by the country. It is estimated that the establishment of the Education Council includes:

“Education Council shall include all sectors, levels, and forms of education to operate as one integrated system supervised over by the council in its new formation as an overall umbrella for education. The function of the council shall not be restricted to legislative aspects and setting educational policies of education, but it shall also follow up the performance of educational institutions and take appropriate decisions in this respect.” (Education Council, 2019)

The Education Council’s vision is “creating a high-quality educational system coping with the latest developments, meeting requirements of sustainable development and boosting the national identity” (Education Council, 2019). Moreover, their mission is:

“setting up policies, following up and evaluating policies to build a high quality, well-integrated and harmonised education system which strengthens national identity and human values amongst students consolidating a culture of creativity”.

There has been a significant shift from the centralisation of power in the MOE. This has helped with time management, since schools’ managers or local governing bodies have the necessary authority to act on their own, eliminating delays due to waiting for the central directives to make the required decisions, making the overall situation much more efficient (MOE, 2007a).

In addition, the use of the decentralised approach allows the mandate of regional directorates by the MOE. In figure 2.2, it can be seen that the 11 directorates in the different states of Oman have their own designated responsibilities. The MOE assigns these responsibilities. The implementation of the strategies used by the MOE allows the fair distribution of duties as per the performance of the teachers as well as the students. It will enable the overall educational system to have the much-needed boost and enhancements in different criteria. The MOE has been very supportive and understanding of these elements, supporting the directorates through investment.

2.3.2 Enhancement of the Educational System and Schools

After 1970 the government of Oman had two primary objectives concerning school education. The first objective was to spread education across all regions in the country. It meant the educational body was focused on increasing the quantity of education in Oman. This can be seen from the number of schools built in Oman since 1970, as discussed in section 2.4 about educational statistics. The second objective was to continuously improve the quality of education through major revisions and development of the curriculum and education systems. Therefore, the quality of education can be seen through the development and reformation of

the education system in Omani schools. This reform of the system will help induce many benefits in all educational stages, from grade 1 to grade 12.

The School Education Statistics Bulletin shows that students in the Sultanate's schools are divided into five types (see figure 2.4), including public schools, private schools, international schools (foreign communities), private education schools and other government schools (NCSI.gov.om, 2019).

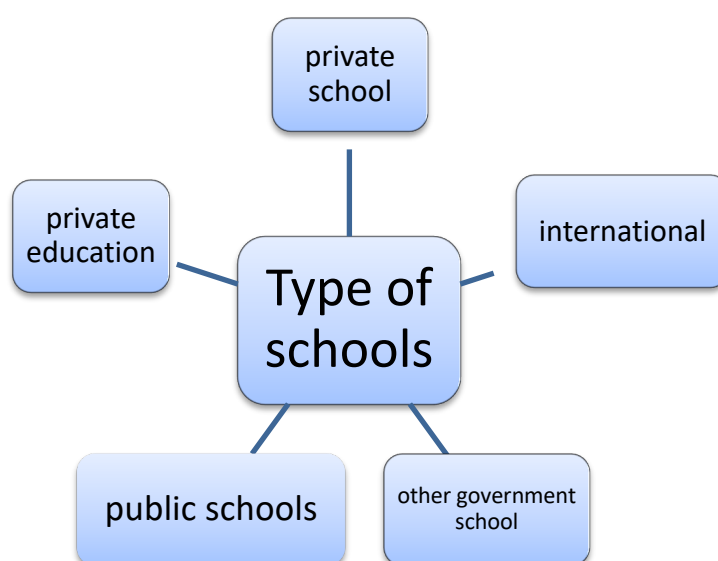


Figure 2.3: *Types of schools in Oman*

Source: Own Illustration

Developments of the educational system focus on the overall basic and the post-basic schooling system. The school system will be able to adopt an approach that is very student-centred. This will enable a better understanding as well as improved learning with the help of information technology and the many life skills that are being incorporated into the curriculum (MOE, 2007a). There have been many elements that have been used for the overall improvement of school life. The use of computer labs has been incorporated in grades 5 to 10, allowing the students to use computers for different types of activities that are related to the curriculum, as well as develop other beneficial skills. The use of stores, health rooms and

canteens are also known to have a positive impact on students in schools. For extracurricular activities there are different stores, as well as the air-conditioned classrooms that are a crucial element (ibid).

The MOE has also induced many positive aspects in terms of the quality of education as well as qualifications of the teaching staff. The competency of the teachers is a factor that can help in the correct implementation of strategies where the teachers would be able to have a better understanding of planning as well as self-management of the system (MOE, 2007a).

The period after 1970 can be divided into three sub-periods. The sub-period between 1970 and 1997, the sub-period between 1998-1999 and the sub-period after 1999. Each of these sub-periods is considered as a significant milestone in the education journey in Oman. The main characteristics of the education system during these sub-periods are as follows:

2.3.2.1 General Education

1970–1997: The MOE aimed to initiate the general educational system in 1970. General education can be defined as the pre-educational system, which was intended to be offered for free for all the nationals of the country. The educational system was estimated to last for 12 years, divided into different levels, starting with the elementary level (MOE, 2004). The elementary level lasted for the initial six years of educational life, and was used to induce the necessary skills and knowledge that would enable the individual student to have a better understanding of the environment and social aspects of the community. It helped in developing robust and integrative values. Additionally, this level prepared pupils for the next educational level.

Students who completed the elementary level successfully were accepted into the preparatory level, which lasted for three years. This level formed the middle stage between the elementary and secondary levels. It addressed the students' social and psychological needs

relevant to their early adolescence. Also, this level aimed to enhance students' abilities, interests, skills, and knowledge, to enable them to progress to the final level. The last level of general education was the secondary level, which lasted for three years. This level prepared students for higher education and employment. This level also considered students' spiritual, mental and social development. In 2015, it was planned to cancel general education as part of the plan for the gradual development of the educational system.

2.3.2.2 Basic Education

1998–1999: The MOE began in the 1998/1999 academic year with the main aim of replacing the previous education system over time with another system optimised for better education. “Basic Education” means:

“A unified 10-year education, provided by the government in the Sultanate of Oman for all children of school age. It meets their basic education needs in terms of knowledge and skills, enabling them to continue their education and training according to their interest and dispositions. It also prepares them to face the challenges of present circumstances and future development in the context of comprehensive social development” (MOE. 2001, p.1).

A link has been established between the theory and the practices, which was identified by the MOE (2011) in basic education. The main aim of such methods is to encourage consideration of careers, as well as the improvement in education and life. The overall development of the personality can be achieved in a very comprehensive manner. The ideology of basic education also allows the enhancement of self-learning skills that can be very beneficial in lifelong education. The primary school has a fundamental aim to ‘meet the utmost pressing need for human development that can be induced in the social aspects’ (MOE, 2011, p.1).

The “basic education system” incorporates 12 years, which are split into two main stages; the basic education (10 years) and after basic education (2 years). The first stage is from the first to the 10 grade; which starts from first to 4 grade. In this stage pupils are aged from 5 to 10. This is the foundation stage. In addition, in this stage both boys and girls are taught together but only by female teachers. This means all the staff in the first stages' schools are female. It aims to provide the children with the values, skills, and knowledge for their age group. The next stage is from the fifth to the tenth grade, with pupils aged from 11 to 15. Moreover, in this stage, the schools are specified for both genders separately from grade 5 to grade 12. Students in the first and second stages are taught compulsory school subjects, namely: Arabic language, Islamic studies, mathematics, English language, science, social studies, physical education, music skills, fine art, environmental life-skills and information technology (MOE.gov.om, 2019).

2.3.2.3 Post-Basic Education

After 1999: The post-basic education system is the final stage of the school educational system. This stage comprises two years of study for the 11th and 12th grades. The main characteristics of this stage are diversity, flexibility, and the choice amongst 11th and 12th grade students. The variety means that this stage meets the needs of the students who have the desire continue their designated studies after the school-level education is completed. Regarding flexibility, this stage allows the students to explore different areas before they commit to their choice of a specific path. Moreover, students are provided with the necessary employment skills and are able to consider the opportunities in the labour market. The curriculum that has been adopted in the post-basic education system is organised on the basis of “core plus elective” subject, which will be able to provide an element of variety in future employment opportunities (World Bank, 2013).

In this stage, students have the freedom to choose from a list of subjects considering their skills, knowledge and inclinations. In addition, this stage aims to continue to develop the basic skills such as communication skills, ability to use mathematics skills, sufficient information technology literacy, problem solving skills and personal and social skills. It is vital for schools to use the adequate amount of information technology, which will be a significant factor in the enhancement of the educational system as well as the personal and social skills of students. The primary aim of these educational standards is to prepare the students for the pressure of higher education and, therefore, they are trained accordingly. In grade 11, students are taught nine subjects, including compulsory and optional courses according to the aspirations, ambitions, and abilities of students. The compulsory subjects are: introduction to information technology, life-skills, research methods, and career guidance. Students in grade 12 are taught eight subjects, including both basic and optional courses. The two compulsory school subjects are: project/career guidance and life-skills. In addition, students choose only one item from each course: Arabic language, Islamic studies, mathematics (pure mathematics, applied mathematics), English language (A: For students who taught at schools with Basic Education System and B: for students who taught at schools with General Education system), science (physics, chemistry, biology, science and technology), social studies (MOE.gov.om, 2019).

Courses	1	2	3	4	5	6	7	8	9
	Islamic Studies	Arabic Language	English Language	Mathematics	Science	Life-Skills	Research Methods and Career Guidance	Social Studies	Introduction in Information Technology
			*EL (A) *EL(B)	*Applied Mathematics *Pure Mathematics	*Physics *Chemistry *Biology *Science and Technology				

Table 2.1: Schools' subjects for grade 11 (post-basic Education)

Source: (www.moe.gov.om)

Courses	1	2	3	4	5	6	7	8
	Islamic Studies	Arabic Language	English Language	Mathematics	Science	Life-Skills	The Project and Career Guidance	Social Studies
			*EL (A) *EL(B)	*Applied Mathematics *Pure Mathematics	*Physics *Chemistry *Biology *Science and Technology			

Table 2.2: Schools' subjects for grade 12 (post-basic education)

Source: (www.moe.gov.om)

2.3.3 The School Timetable

A total of eight months is the general period of study in schools in a year, and the remaining four months comprise short breaks during studies (MOE.gov.om, 2019). However, it has been observed that this period is not enough as per the standards set by the MOE for a knowledgeable student. The students are not able to compete economically in the world. Therefore, the MOE has decided to increase the study period in a year to 180 days (9 months).

The time for a single lesson in the first to ninth grades is 40 minutes, while the duration of lessons in grades 10 to 12 is 45 minutes. However, it has been decided that the children studying in the first to sixth grades in the schools that have two shifts (morning/afternoon) the duration of a lesson is 35 minutes. Schools teach for five days per week, in which a total of 35 lessons in general schools and 40 lessons in basic schools.

2.4 Government Educational Statistics

According to estimates, the total number of students in the academic year 2013/2014 in public schools was 516,891, although the schools operating in two shifts decreased to 10% from 37% in the same academic year. The goal of education for all was achieved in Oman, which is evident from the statistical figure that shows that the enrolment rate for the first cycle of basic education was 98% and that of the second cycle was also 98% (NCSI.gov.om, 2019). Grades 1 to 4 accounted for the first cycle, while grades 5 to 10 made up the second cycle. These results confirm that the Sultanate of Oman has achieved 98% enrolment as per their target for primary education. The education programme targeted at early childhood education and care had an increase of 15% from the prevailing 25%. Continuing these growth targets in the year 2016/17, total enrolments in Oman reached 724,395, while the number of teachers remained at 67,901. These figures were obtained from the National Centre for Statistics and Information (NCSI, 2017).

In addition to these statistics, the total number of students in public schools was 540,068, whereas the total number of students in private schools was 101,860. The contribution of public and private enrolments was 74.6% and 14.1% respectively. The number of students in international schools was 60,425, making up 8.3% of the total registrations in Oman. Schools that are run under the supervision of police and armed forces, for instance, Islamic schools, schools run by the directive of public organisations like the Women's Association and schools running under the administration of the Ministry of Religious Affairs contribute 3% of the total number of students, with 21,555 enrolments (NCSI.gov.om, 2019).

It is estimated that there was one teacher for every 11 students on average; however, the average number of students in post-basic schools in Oman out of 647 schools was 439. Students pursuing post-basic education consist of 142,987 males and 135,759 female, giving a total of 278,746 students. This shows that 38.5% of the total number of students in Oman were in post-basic education. In comparison, the total number of students in basic schools was 221,846 contributing 30.6%, of whom 112,754 students were male, and 109,092 students were female. In contrast, the number of kindergarten students was 77,766, making up 10.7% of total enrolments. Of these kindergarten students, 38,789 students were male, and 38,977 students were girls. Table 2.3 represents the number of students, both male and female at each educational level.

Educational level	Male	Female	Total	%
Post-Basic Education	142,987	135,759	278,746	38.5%
Basic Education	112,754	109,092	221,846	30.6%

Kindergarten	38,789	38,977	77,766	10.7%
Education				

Table 2.3: Number of male and female students in each educational level

The government of Oman considers the requirements of children with special educational needs and takes measures for their mental and physical growth and development by providing them a platform where they can learn and develop their personality. There are 324 boys and 194 girls studying in special schools. Apart from the figures mentioned above of students studying in basic, post-basic, special and kindergarten education, there are other students who are enrolled in various literacy programmes, which had reached 7,355 students. Most of the students who are enrolled in these programmes are female (7,102). The Sultanate of Oman has worked for the arrangement of adult education. The provision of education in Adult Centers provided to 19,217 students in which males were the majority, at 15,420. The following statistics are based on the latest figures for the year 2015/2016 (see tables 2.4, 2.5 and 2.6).

Level	Grade	Age	Percentage
Kindergarten	3-6 years	Under 6	10.7%
Basic education First cycle	1-4	6-11	30.6%
Basic education Second cycle	5-10	12-15	38.5%
Post-basic education	11-12	16-17	11.5%
Other public education	1-12	No specific range	8.7%

Table 2.4: Students attending schools in Oman at the different grades and ages

Source: (NCSI.gov.om, 2019)

Governorates	Male	Female
Muscat	16,900	18,000
Dhofar	7,400	7,900
Musandam	900	900
Burami	2,100	2,100
Dakhilyah	15,600	15,100
North Batinah	19,700	19,400
South Batinah	13,000	12,900
North Sharkiah	8,700	8,800
South Sharkiah	8,200	7,900
Dahrah	6,100	6,000
Wastaa	1,200	1,100

Table 2.5: Number of students in public schools by gender in different governorates

Source: (NCSI.gov.om, 2019)

Governorates	Number of teachers	Number of schools
Muscat	8,330	153
Dhofar	6,160	151
Musandam	883	17
Burami	1,478	27
Dakhilyah	8,054	142
North Batinah	10,270	177

Governorates	Number of teachers	Number of schools
South Batinah	6,790	119
North Sharkiah	5,036	90
South Sharkiah	4,476	88
Dahrah	3,952	81
Wastaa	1,157	23

Table 2.6: The number of teachers and public schools in different governorates

Source: (NCSI.gov.om, 2019)

According to the Alwatan newspaper (2019), 748,308 students were studying in Oman in the year 2016/17 at different levels. The average number of students enrolled in a single class was 26, and total number of schools in Oman was 725 in which there were 28,879 classes in total, with 68,384 people employed as teachers. Figure 2.3 below summarises these statistics;

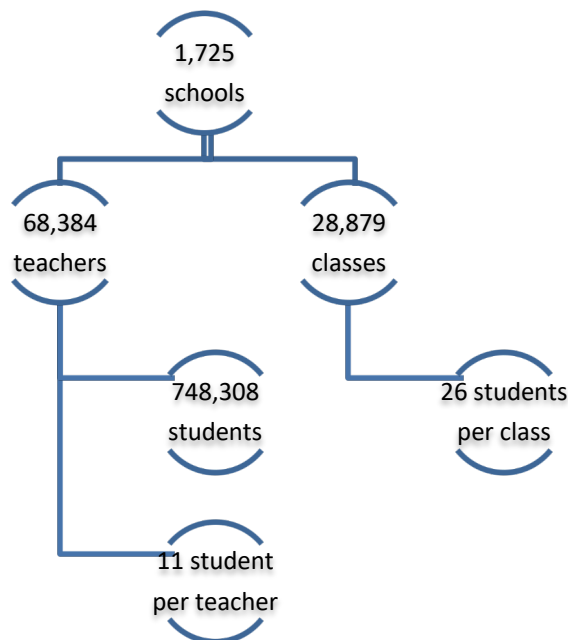


Figure 2.4: School's education statistics 2016/2017

2.5 Environmental Protection Policies and Strategies in Oman

A large amount of waste is continuously produced on the Earth. It is high time that the public thought about maintaining environmental policies so that rubbish and pollutants can be discarded efficiently. Oman is home to various ecological and climatic conditions, for instance, deserts, valleys and coastal areas. Sultan Qaboos has made every effort to save and preserve the natural climate of this land (Oman.om, 2019). As the countryside of Oman is considered a national asset, the Sultanate has made significant progress in the establishment and implementation of environmental laws, methods, plans and projects. This should ensure that appropriate safeguards are in place for working conditions in Oman. Additionally, it contributes to minimising pollution and climate change to better manage extreme weather conditions (Oman.om, 2019). Since this decision of Sultan Qaboos, improvement of the environment has been met with considerable success. He created a consultancy bureau for environmental protection in 1974 as part of the Royal Diwan. In 1979, the Council for the Prevention of Pollution was created. In addition, Oman has put in place a legal instrument for the conservation of the environment. The primary legislation is the Protection of Environment and Combating Pollution Act passed in 2001. This regulatory regime imposes severe penalties for the contamination and waste in the land and waters of Oman. Oman is also one of the leading Arab countries that has developed a national strategy for environmental protection, which became a mechanism for managing and organising environmental problems.

2.5.1 Sultan Qaboos Award for Environment Preservation

The work of the Sultanate in protecting the global environment has been widely recognised; awards for Arabs and non-Arabs were introduced with the name Sultan Qaboos Environment Award. The award was given to those whose work contributes to the preservation of the environment. It was created in 1989 and should be regularly awarded to a group of

people, to a foundation or to an association, to contribute to the protection of the planet. It recognises the creative and productive efforts of selected people and encourages others to participate. The award is given every two years. The award was introduced with the purpose of inviting scientists, educators, thinkers, specialised associations and institutions, and governmental and non-governmental organisations that make an extraordinary effort in environmental research and maintaining the environment's natural climate to alleviate the risks of endangering the environment due to excessive human activities that upset the balance in the environment.

As per the criteria, the award is given to individuals who have done remarkable work in the following fields:

- Research on ecological and natural resources
- Environmental education
- Creation of awareness programmes for the conservation of the environment
- Creation and supervision of protected areas, such as World Biosphere Reserves and natural World Heritage Sites.

The Oman Commission for Education, Culture, Science, and the Sultanate's Permanent Delegation to UNESCO undertakes a fundamental role in promoting the environmental preservation programmes in the Sultanate of Oman by collaborating with UNESCO's MAB (Man and Biosphere Program) (UNESCO, 2018). See appendix Q for the winners of the Sultan Qaboos Prize for Environmental Preservation.

2.5.2 Environmental Society of Oman

The Environmental Society of Oman (ESO) was founded in 2004. This society focuses on the future development of Oman and thus promotes preservation and conservation of the environment by creating awareness in all sectors.

2.5.3 Ministry of Environment and Climate Affairs

Sultan Qaboos gave attention to environmental protection after the renaissance of Oman when he took the crown. Oman recognises that protecting nature can improve a country's economic progress. Over the past four decades, the Sultanate has achieved significant achievements in terms of the environment. These are:

- The first country of the Persian Gulf to have adopted the law on environmental protection.
- The first Arab prize in the field of the environment, the Sultan Qaboos' Environmental Protection Award.
- The first ministry focused on the environment in the Arab States.
- The United Nations Environment Program (UNEP) has ranked it amongst the top ten countries in soil and environment protection.

The primary goals of the Ministry of Environment and Climate Affairs (MECA) are mentioned below;

- To develop master plans for soil protection, pollution control, and nature conservation, policy and projects, and monitoring and evaluation measures taken for environmental conservation.
- To ensure the control of pollution, the safety of the environment, and the sustainability of the ecosystem.
- To develop strategies for the preservation of wildlife, conservation of the natural environment and sustainability of renewable resources.

2.5.4 Be'ah Company

Be'ah S.A.O.C (Societe Anonyme Omanaise Close) was created in 2007. In 2009, Royal Decree No. 46/2009 recognised Be'ah responsibility for the efficient management of waste and gave it the legal status for solid waste management in Oman. In this context, Be'ah strives to achieve controlled management of waste, following universal standards and necessary practices, restoring the waste accumulation services in the municipality and becoming more familiar with environmental waste management. The strategic objectives of Be'ah are:

- Controlling the damage done to the environment.
- Structuring waste management services.
- Developing the waste management sector in Oman.
- Supporting the economy of Oman.

2.5.5 Oman Gulf Company

Oman Gulf Company S.A.O.C. in the Sultanate of Oman continually implements policies to ensure the health, safety, and well-being of every employee and every person affected by their activities, including businesses, contractors and the public. The Oman Gulf Company S.A.O.C. is also dedicated to natural environment protection. Oman Gulf Company S.A.O.C focuses on:

- Social security and protection of the planet.
- Workplace protection.
- Respecting the laws regarding communities, lifestyles, and networks that affect their operations.

2.6 Environmental Topics in Schools' Curricula in Oman

Environmental topics are integrated with schools' subjects in Oman. Moreover, environmental topics vary in depth from grade 1 to grade 12, as illustrated in the Omani School Environmental Education Curriculum Framework (see figure 2.5). This variation mainly depends on the age group, which impacts the level of understanding of the concepts and topics discussed in each educational stage. Table 2.8 represents environmental topics covered in schools' subjects for grades 4 to 12. "Human and environment", issued in 2011, was the first separate school subject that discussed environmental issues. The book deals with two broad concepts: "Man and the environment". Moreover, it talks about human beings, the interaction of human beings with its various races, origins, and colours, and contemporary living man. It also discusses the relation between man and his environment. It leads us to understand the importance of linking these activities to the responsibility of a human being toward the environment. Also, it explains the distinction between developed countries and developing countries. It highlights the role and responsibility of the man of previous centuries, the man of the societies of antiquity, from the beginning of the existence of Adam until the present day, in shaping the relationship between man and the environment. These topics are covered in grade 4, 5,7,9,10,11 and 12 in different subjects.

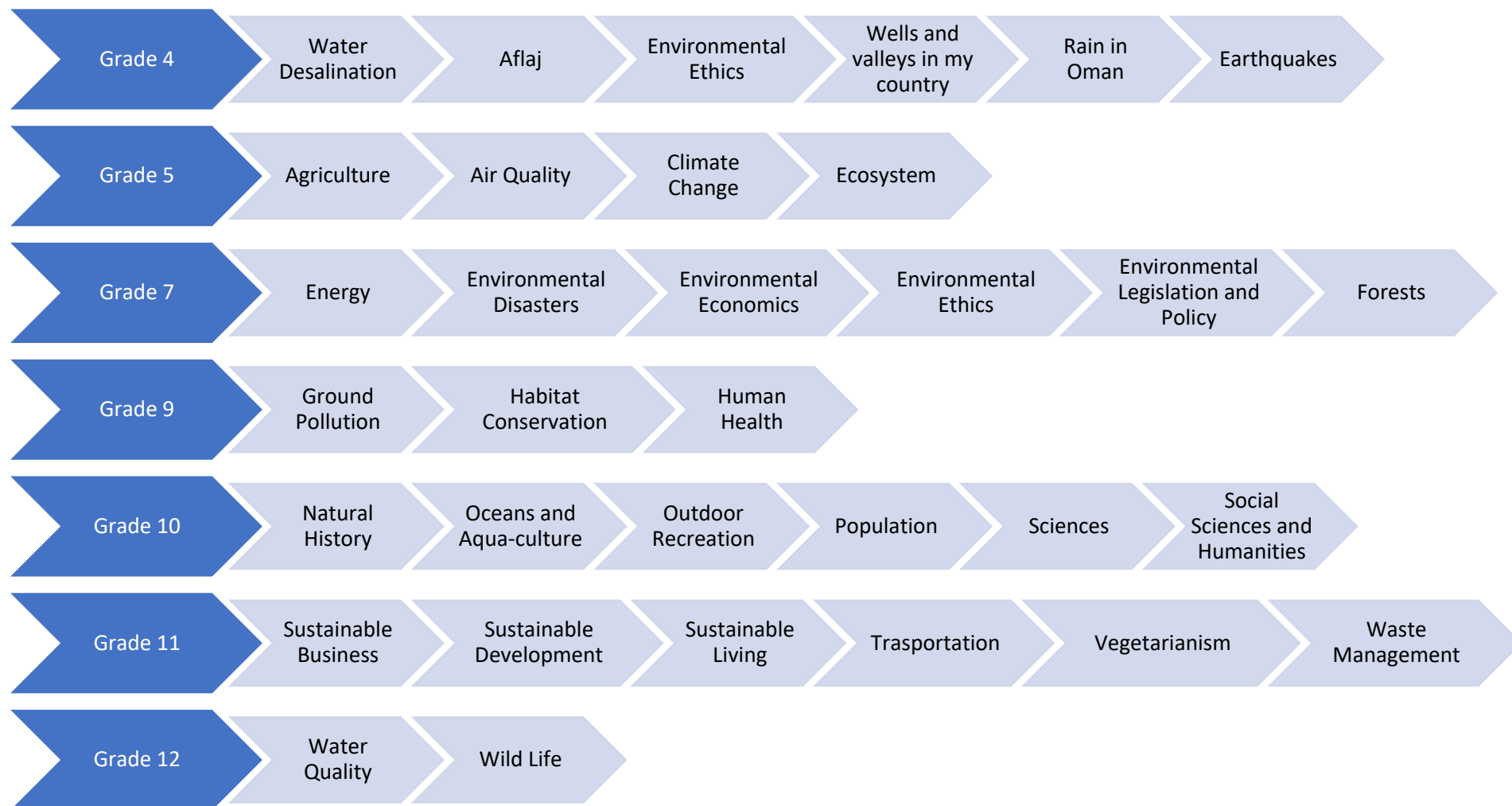


Figure 2.3: Omani school environmental education curriculum framewok

2.7 Chapter Summary

This chapter has discussed the background information about the development of education systems in Oman, Oman's initiatives toward preserving the environment. Basic education has been achieved and the government has achieved high school access results; its efforts now turn to the quality of its education. It is essential that students achieve adequate levels of learning: a necessary condition for economic and personal development. This chapter provides background information about environmental education curriculum and its framework. The next section will provide a comprehensive review of the literature related to this study.

CHAPTER 3: LITERATURE REVIEW

3.1 Chapter Overview

The purpose of this chapter is to provide a comprehensive review of the literature about global environmental education in schools, and studies relating the factors that influence individuals' environmental attitudes and behaviours to achieve the aims of environmental education. The first part of this literature review will discuss the meaning of environmental education, while the second part will look at the aims of environmental education. Moreover, it will point out some of the challenges facing environmental attitudes and behaviours. It will also present approaches to individuals' environmental attitudes and behaviours and the influencing factors. The final part will provide an overall summary of this chapter.

3.2 Alignment of Sustainable Development Goals with Oman's Social-cultural and Economic Context.

The sultanate of Oman is one of the Gulf Cooperation Council countries (GCC). It is located in the south-eastern part of the Arabian Peninsula. It is the second largest country within the GCC countries with a total area of approximately 309 thousands square kilometers. It shares borders with three countries; Saudi Arabia from the west, United Arab Emirates from the North and Yemen from the south. Oman has approximately 3500 kilometers of coastline from Musandam up in the north to the end south of Dhofar. (Al Nabhani, 2007)

Oman is divided into eleven administrative areas known as governorates and these governorates consist of sixty Wilayates (i.e. Cities). Majority of Oman land is barren land with mountains. Sands, mountains and gravel comprise around 80% of the country main land. Despite

the fact that majority of Oman land is sand and gravel, there are still some areas in the country which are suitable for agriculture such as Al Batinah North governorate and Dhofar governorates. Also, some mountains in Oman are suitable for living like Al Jabal AL Akhdar (the Green Mountain) and people in these mountains tend to grow different types of fruits and vegetable which cannot be grown in the rest of Oman land (Al Nabhani, 2007).

The climate in Oman is generally hot throughout the year. The winter season last for couple of months only. It starts in mid of November and ends by mid of February. Although during summer most of the governorates witness high degrees of temperature between 48 to 50 degrees, in the governorate of Dhofar the case is different. Dhofar gets the Indian ocean monsoon rains which turns it into a lush green paradise with cool temperature. Which makes it a very attractive tourism destination to many of the GCC residence (AL Nabhani, 2007).

In the last 15 years Oman was hit by enormous cyclones which have caused serious damages to the country infrastructure and economy. The series of cyclones started in 2007 with Guno cyclone which was considered as the biggest flood since 1890. Guno cyclone caused 49 deaths and destroyed a lot of the country infrastructure which result in a financial loss of around \$ 4 billion. However, the country has learnt a great lesson from Guno and managed to control and minimize the impact of other cyclone that had happened so far in term of number of deaths, financial loss and damages to the infrastructure (Al Naamani, 2016).

In 2018 Oman's total population is 4.6 million which increased by approximately one million compared to 2012. Total Omanis represent 46% from total population while expatriates represent the remaining 54%. Oman has many expatriates because it is a developing country and majority of those expatriates are working in constructions, farming or household. Males population represent 65% of total population while females constitute 35% (NCIS, 2020).

The distribution of population pyramid for Omanis by gender is almost equal with 50.4% male and 49.6% female. Youth and children (i.e. less than 29 years old) constitute the largest segment of Omanis population. They represent almost two third (64%) of the country total population. On the other hand, expatriates' males are five folds of expatriates' females. Since majority of expatriates are coming to Oman to work, 95% of them are between ages of 15 to 64 years old (NCIS, 2020).

Oman economy depends heavily on oil and gas production. The country budget for the year 2019 shows that the total revenue is \$26 billion. Revenue generated from oil and gas represent 75% of total revenue while the remaining 25% are earned from government tax and services fees. The total expenditure for the same year is \$33.8 billion this result in a total deficit for the year to be 30% (KPMG, 2019). Oman discovered the presence of oil reserves within her territories in 1960s. However, political instability and financial constraints made it difficult for the country to capitalize on the resources and achieve economic development as is witnessed in other states until the 1980s. Under the rule of Sultan Qaboos, the country managed a transformation from a developing country that posted a per capita income of \$360 in 1970 to a developed state that boasts a per capita income of \$20200 as at 2008. Oman is a very conservative country when it comes to annual budget and in 2019 conservatism financial management continues to be priority for the Sultanate to maintain the level of budget deficit below 10% of its GDP (KPMG, 2019). Oman's GDP at the end of 2018 is \$79.3 billion and GNI per capital is \$16 thousands with 8% increase compared to previous year. In 2019 Oman's real GDP is expected to grow by 0.3% as oil production remains capped by OPEC production cut agreement ((NCIS, 2020).

Nonetheless, the scarcity of the country's oil reserves which are estimated to be used up by 2040 has prompted developments in other sectors which include bolstering foreign investments, tourism and information technology; in a bid to cut down the dependency on oil. The IT in the country is fast rising more so among the youth; which gives the society a platform to contribute to the information flow in the country thus bolsters effective journalism.

Culturally, Oman is ruled in with aid of Islamic religious laws, where the people strive to live as good Muslims. Moreover, the human rights section of the Omani system has not been established as much. However, the country is in the process of embracing diverse cultures in a bid to divert from its dependency on oil exports in its economy. This has prompted moves such as increased investment in the education sector to further enlighten the masses which will foster development. Besides, the Sultanate has embraced privatization in Oman with an objective of bolstering the living standards of the citizens; leaving the government to manage the country's social and environmental responsibilities in a stable economic environment. Besides, Oman has liberalized both the local and foreign investment adopting the policy of free economy.

Oman is putting effort into aligning its goals with SDG11 and SDG12. One of the aims of the Sultanate of Oman, aligning with SDG11, is to improve the living conditions in slums and to provide safe environments for individuals (Hermans and Korhonen, 2017). As part of SDG11, Oman is strengthening its natural heritage by keeping its environment safe and pollution-free. Special attention is paid to air pollution and waste management as per SDG12 so that adverse per capita effects on the environment can be reduced (Drews and Van den Bergh, 2016). Sustainability means adapting to climate change and transforming to green spaces; through education, the Sultanate of Oman is providing the skills and knowledge needed for sustainable development. All these aims can be achieved through SGD4, quality education, as adopted by Oman, which advocates education for all by removing gender disparities and providing

opportunities to all (Thomson, 2015). The goal of access to primary, secondary, vocational and technical education to all would support the objective of environmental protection because Oman achieves this aim by including an environmental curriculum in all fields and at all levels (Education for All in the Sultanate of Oman, 2007a).

Besides, Oman is dependent on the Oil industry; which accounts for 70% of the country's economy. However, Oman's oil and natural gas reserves have been predicted to be depleted by 2040; besides not occurring in abundances as is witnessed in other gulf states, which has hindered the establishment of the country as a global trade hub despite its strategic location. Consequently, Oman has experienced less economic development in comparison to other GCC states; which insinuates that the country records a low per capita income as well as suffers high unemployment rates. Conversely, under the leadership of Sultan Qaboos, Oman opts to undertake a transformation of its economic structure in alignment with the country's Vision 2040 which was promulgated in 2019. The country aims at cutting down its dependency on dependency on hydrocarbon products and diversify its economic developments to include a robust production industry, tourism, mining and port management. Besides, Oman aims at embracing the adoption of renewable energy sources over hydrocarbon energy.

Millennium development goals (MDGs) and sustainable development goals (SDGs) both have some common indicators that suggest that education, environmental conservation and development are equally important for the betterment and welfare of generations. MDGs were introduced by the United Nations (UN) in 2000. Eight targets were set which were mutually agreed by 191 member states to be achieved by 2015 (WHO, 2019). There were eight goals with different targets and indicators, out of which MDG2 and MDG7 advocated primary education and environmental sustainability (Hermans and Korhonen, 2017).

Later, they served as a foundation for the articulation of SDGs when UN Secretary-General Ban Ki-moon announced bold and robust goals with the agenda of achieving them by 2030. The SDGs aim to save the Earth and people living here (Griggs et al., 2013). The framework of SDGs contains 17 targets which would be likely to be achieved by 193 countries (WHO, 2019). These goals were established to bridge the gap that was created by MDGs (Dal et al., 2015) because they were so precise, specific and targeted that they ignored some other important areas. Another reason for the development of SDGs is that the success achieved by MDGs in the area of education was uneven (Thomson, 2015). SDG4 (quality education), SDG11 (sustainable cities and communities), and SDG12 (responsible consumption and protection) are aligned with Oman's agenda for environmental education and the saving of environment from degradation. Though education is included within the indicators and more generally seen as a catalyst to achieving these goals set by Oman, education is also seen as the process by which these goals will be addressed. Dillon (2016) emphasised the need for education by mentioning that education and sustainable development are the counterparts of a whole. They go hand-in-hand and are incomplete without one another (Choudri et al., 2016; Hedefalk et al., 2015). Education induces continuous development in a person, therefore, education that is aimed at the preservation of the environment is likely to induce progression towards saving the environment. So, education has its SDG4 but it plays a central role in all the others, including those on sustainable and responsible consumption (SDG11 and SDG12).

Global warming is an international issue, and Oman is equally responsible for contributing it. Nevertheless, SDGs are a large, overarching initiative that demonstrates the importance of environmental concerns as a global challenge. Education is seen as the process by which these will be addressed. The impact of environmental education ensures that issues such as nature reserves, global warming, food security and other alternative natural resources are addressed

(Al-Balushi and Al-Aamri, 2014). The Geneva Consensus for Sustainable Development (Lu et al., 2016) is a platform for synergising different policies and making a framework with collaboration so that the potential of the world's communities can be integrated to overcome the economic and environmental turmoil. As per SDG11, environmental sustainability is one of the main points of concern for international regulatory bodies.

3.3 Environmental Education

3.3.1 What is Environmental Education?

The environment is a set of physical, biological, economic, social and cultural factors that relate to humans. Environmental awareness is the ability to be conscious of the dangers facing the environment and the need to make a positive impact on any undesirable actions by humans (Rafe et al., 2015). Individuals research and identify environmental issues, and seek answers for the problems highlighted in a process. Dillon (2016) stated that there is a point where environmental education and science can converge. He suggested that until the age of 11, children are taught by a single teacher who provides science education to interact with students rather than being the subject of the curriculum as science subjects in classes after grade 7. These teachers are required to provide environmental education as well, because of the scientific knowledge involved in the conservation of the environment (Dillon, 2016). Teachers providing environmental education must receive training at regular intervals. However, Dillon (2016) further observes that environmental education is best dispensed through constructivism pedagogy where the learning process is continuous and is built on prior knowledge on sustainability practices; where one formulates their individual subjective representations of reality.

Environmental education aims at preparing students to make efforts for the sustainability of the environment and transforming them into responsible citizens (Tilbury et al., 2005). UNESCO defines environmental education as “the process of recognising values and clarifying concepts to develop skills and attitudes to be able to understand and appreciate the relationship between men and the surroundings” (Abdul-Wahab et al., 2015). The chapter puts into perspective the challenges, and how environmental education is used as a tool for addressing some of these challenges. However, there are two other definitions that could be considered as comprehensive. Environmental education is “the process of recognising values and clarifying concepts to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture and his biophysical surroundings” (Mansour et al., 2018). There are five components of environmental education: “awareness and sensitivity, knowledge and understanding, attitudes, participation, and skills.”

Environmental education also entails practising in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality. The second definition of environmental education, cited by Dal et al. (2015), is “the study of the activities of people in relation to the physical world around them, and the study of the socio-political institution, for instance, the statutory planning system, which regulates this relationship in the interest of society”. Environmental literacy is essential in providing environmental education, and it can be increased in Oman by providing national leadership through the Basic Law of Oman (RD 101-1996). However, the framework specified for the protection of the environment is the “Law for the protection of environment and prevention of pollution” (RD 114-2001), which entails that strict penalties would be imposed on the release of effluents and pollutants in the marine and land territory of Oman (SustainableOman, 2018).

Al Jabri et al. (2018) stated that environmental education is different from environmental information, and individuals must be well-versed in both for the conservation of the environment. Environmental education enhances critical thinking among individuals by increasing awareness of the environmental issues among the public. This awareness grows the decision-making skills of individuals as they can analyse every option available for problem-solving and choose the best ways to cope with the problem by analysing it from different perspectives. In contrast, Hermans and Korhonen (2017) argued that environmental information may not enhance critical thinking, decision-making and problem-solving skills, however, as it provides facts sheets related to environmental issues and may advocate a specific opinion, viewpoint or attitude. Therefore, by providing insight into environmental information, environmental education offers a way of managing and sustaining the environment.

It can be noticed that the two definitions mentioned early in section 3.2 have some similarities, but at the same time, they are different from each other. The differences between the two definitions can be summarized in two points. First, the first definition focuses on the importance of increasing and stimulating the values and code of behaviour of students concerning environmental issues. Nonetheless, it emphasises the role of individuals in the environment. However, there is a crucial aspect, which has not been touched by the first definition. This aspect is the role of regulatory institutions and the need to have rules and regulations to govern individuals', societies', and corporations' actions toward the environment. Students must learn that there are international and national organisations that monitor, govern and punish any entity that violates the environmental code of practice. Building such knowledge will help students to look at the issue from a broader perspective and, at the same time, enable them to link their role with the role of other organisations and parties within society.

The second definition highlights the significance of the practical side of education. It requires the teachers to identify the activities, actions, and choices of today's people that harm our planet. In other words, the second definition argues that if environmental education focuses only on teaching the students morals and codes of conduct related to our behaviour toward the environment without the illustration of real-life cases, the students will leave school with a significant gap in their environmental knowledge (Al Jabri, Silvennoinen and Griffiths, 2018).

Therefore, it can be stated that the need for practical and real-world exposure, along with the theoretical aspects and experience of the workings of regulatory bodies, is necessary to be taught to the students. This is the basis of framing the aims and objectives of this study. The aggregation of the two definitions will help us to identify the possible aims and objectives of environmental education, and this will be presented in section 3.4.

Over the years, there has been significant growth in the environmental topics providing positive student outcomes in diverse areas such as mathematics, reading and science. Well-organised environmental education programmes do much towards attitudes and knowledge, as well as the performance of the students. Environmental education improves critical thinking, life skills and standardised performance (Bokova, 2011). Besides the potential of improving the learning experience, there have been challenges in the number of teachers trained in environmental education for the school curriculum. According to statistics in Oman, in the area of environmental education, teachers have fewer than ten years of work experience, and only 5% of all teachers have received training on the ways of providing environmental education (Al Jabri et al., 2018). Programmes have a core subject in isolation from environmental topics. This has contributed a lot to the setbacks, as many teachers have no foundation in environmental education. There are some significant challenges on the pedagogical teaching of environmental

education in school in Oman. Therefore, the government has come up with strategies to enforce environmental education to meet the goals.

3.3.2 Aims of Environmental Education

Environmental education is essential to develop concern and awareness among school students about the importance of a clean environment. Therefore, the first element in any environmental education syllabus is to create a good amount of environmental knowledge for schools' students, which help them to successfully deal with environmental issues (Kusturica et al., 2016; Wiseman et al., 2014). Environmental knowledge allows students to acquire a basic understanding of the environment and its associated problems. Moreover, this awareness leads students to explore the community around them, especially concerning environmental issues. O'Donoghue et al. (2016) stated that environmental education encourages students to link their personal lives and actions with problems of the environment. Therefore, students acquire some social values regarding the importance of a clean environment. It drives students to participate in the protection and improvement of the environment. In addition, environmental education helps young people develop a coherent insight into human behaviour and the effects of this on people and the environment (Stanišić and Maksić, 2014).

As a result, Folaranmi et al. (2018) pointed out that this cognitive domain prepares students for contemporary reality, which is one of the essential objectives of environmental education. Hermans and Korhonen (2017) indicated that involving students in world problems would help them to attempt to solve the issues. For instance, through their personal choices of commodities that would ultimately have less impact on the environment. Besides, environmental education is vital to prevent harmful effects on human health and severe damage to the environment caused by pollution associated with economic development. All of this would enable communities to enjoy a good and healthy life. Therefore, the rationale of environmental education is to make

sure that students are well equipped with environmental knowledge. However, before examining this issue theoretically, it is important to clarify that environmental education in Oman is taught through integrating it with main school subjects such as science, social studies, and citizenship education. Concerning global issues, AL-Maamari et al. (2014) conducted a study in Oman to explore the contents of social studies, which are taught to a student from grades 3 to 12. They found that the social studies curriculum focused on environmental issues, economic issues and natural disasters.

Also, Al-Maamari (2014) examined the inclusion of some global issues in the social studies textbooks (grades 3 to 12). The result showed that social studies textbooks include four out of the five global issues in their analysis checklist: economic issues, issues of developing countries, environmental issues, population issues, but lacked political problems. Al-Balushi (2016) stated in his study about “the perception of social studies teachers” about social studies goals and content areas in Oman that, over the years, global citizenship education has increasingly become an essential aspect of the social studies curriculum. The aim of Global Citizenship Education Development (GCED) is to cultivate humanistic behaviour among individuals and nurture solidarity, so they feel connected to the environment and feel a responsibility towards it (see figure 3.1). It is focused on achieving the education target of 2030 by collaborating with Education for Sustainable Development (ESD) to work for attaining target 4.7, which requires that learners must acquire education for the promotion of sustainable development as a whole and sustainable development of the environment (Sustainable Oman, 2018). This idea was proposed to induce harmony among the people in Oman and across international borders.

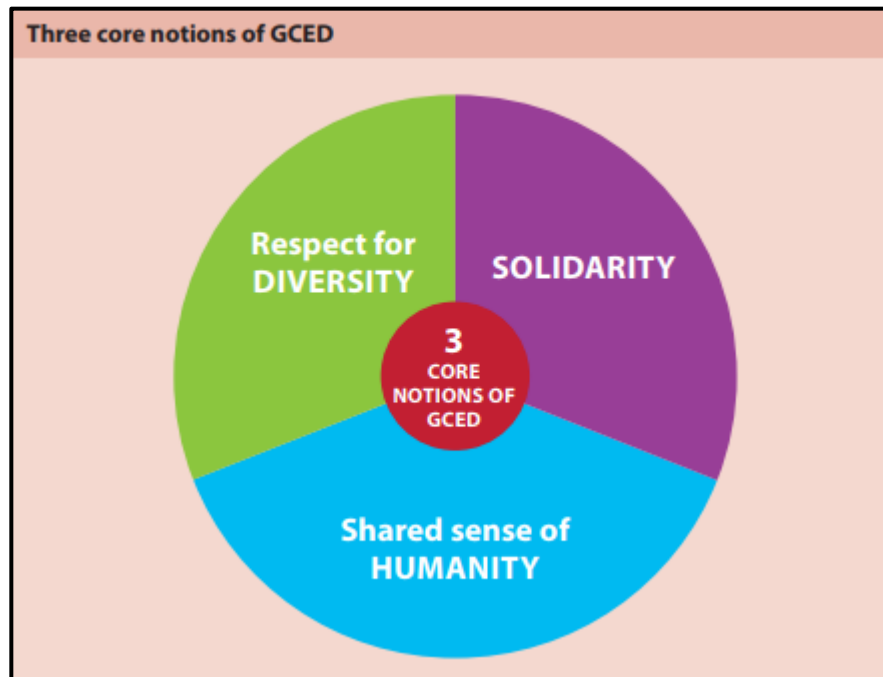


Figure 3. 1: Components of Global Citizenship Education Development (GCED)

Similarly, Al-Balushi (2016) mentioned that the purpose of citizenship education in Omani schools is to help students develop the knowledge, skills, and dispositions needed to live effectively in a world possessing limited natural resources. In addition, it would be sufficient to start with exploring the degree of awareness of Omani students about environmental issues. There has been more attention on the issues and problems surrounding the environment in Oman over the last decades with no specific awareness campaigns to the public about the right attitudes towards the environment (Chang and Kidman, 2018). The attitudes of society can be transformed positively by starting at the very beginning, introducing a comprehensive curriculum formulated on the subjects related to environmental sustainability and conservation.

3.3.3 Characteristics of Environmental Education

Moving towards environmentally conscious behaviour and sustainable consumption has become one of the main challenges for humanity in the last few decades. Environmental education and its role in changing the attitudes of students is, therefore, crucial in altering future individuals' behaviour. Environmental education provides recipients with an understanding of the key environmental issues facing the world today. It presents an outline of the issues, the scientific background, and the role that humans have in both exacerbating and minimising negative environmental impacts (Abdul-Wahab et al., 2003). It also introduces the concept of sustainable development, emphasising the relationship needed between development, society, and environment (Zafar, 2016). Environmental education depends on personal commitment and motivation with an emphasis on having a clean environment and a good standard of living. However, Ambusaidi et al. (2014) study in Oman showed that although the pre-service science teachers believed that global warming is happening now, and they were aware of the measures that the individual could take to protect the environment, they showed a lack of willingness to adopt environmentally friendly actions in some of the key areas in their survey.

Moreover, environmental education programmes should include teachers educated and trained in environmental issues to achieve the aims of environmental education effectively (Chang and Kidman, 2018). Environmental educators can help the young students' innate curiosity and motivation, providing them with continuing opportunities to explore their environment and engaging them in direct discovery about the world around them. Furthermore, environmental education programmes should cover both theoretical and practical aspects so that real-world exposure can be given to students, in addition to the lessons taught in the classrooms (Geyer et al., 2016; Stanišić and Maksić, 2014). These programmes must be focused on reducing pollution in general and industrial waste in particular. Al-Balushi and Al-Aamri (2014) claimed that the

public in Oman lacks in knowledge about global warming, ozone depletion and climate change. These topics need to be included in the theoretical aspects of the environmental education programmes to build up students' knowledge about issues related to the environment. Similarly, the proponent of environmental education, Abdul-Wahab (2008), also stated that the Ministry of Regional Municipalities and Environment in Oman is required to arrange educational programmes for the public to foster positive attitudes and behaviours towards the environment. To do this, mass media is an important medium to spread the word. Mansour et al. (2018) mentioned that there is an association between environmental education and demographics, which needs to be catered for while designing programmes for environmental education and awareness.

Several organisations are geared toward protecting the environment. Earthwatch Institute, an international organisation, is working for framing regulations for the environment in Oman. The Environment Society of Oman (ESO), founded in 2004, works for the conservation of marine life, land ecology and raising public awareness of environmental sustainability in Oman. The dominant projects that the ESO is taking into account include Project Wa'al, Project Shajar, the Frankincense Trees Conservation Project, the Daymaniyat Islands Nature Reserve Education and Research Project, and the Mooring Buoys Project for the protection of coral reefs in Oman. The recycling and anti-plastic projects are also dealt with by the ESO. Stanišić and Maksić (2014) stated that students need to become acquainted with a variety of skills. Therefore, involving students with a real-world problem will lead to the effectiveness of environmental education (Courtenay-Hall and Rogers, 2002) . Correspondingly, the students can collaborate with these organisations and come up with annual or seasonal campaigns to cure the negative environmental culture. A progressive campaign that advocates for the protection of the environment ultimately causes protection from the public. The objective of having practical

activities in environmental education subjects is to allow the students to apply some of the concepts they learn from these subjects in the real world for their practical exposure.

Therefore, engaging students in practical programmes to face environmental problems and to learn how to solve environmental issues, in reality, is an essential step towards raising students' knowledge and improving their attitudes towards the environment. The knowledge acquired from the educational programmes transforms the attitudes of the students.

Furthermore, current literature indicates that science education is believed to have an important role in equipping individuals with the required environmental knowledge, which leads to positive environmental behaviour (Al-Balushi and Al-Aamri, 2014; Courtenay-Hall and Rogers, 2002). However, more emphasis should be given to the link between protecting the environment and economic development (Stanišić and Maksić, 2014). In other words, students should learn that protecting the environment does not necessarily lead to adverse economic conditions.

Indeed, protecting the environment through the development and creation of clean production technologies will create thousands of opportunities for young people. Promotion of green technologies and their implementation in the industrial and automobile sector will minimise air pollution. The investments in green technology in the fields of automobiles, oil, and gas, and renewable power capacity will open employment opportunities for the public (Abidin and Powmya, 2014). Students taking environmental education will benefit from this because they would have hands-on knowledge of clean production technologies. Most companies today, even in developing countries, are shifting towards clean technologies, and this will encourage the young generation to acquire environmental knowledge (Kemp et al., 2005). Therefore, environmental education should include school trips to some fields such as companies and factories to illustrate the recent attempts by the industry to protect the environment (Behrendt and Franklin, 2014). It will not only give them exposure to the recent developments in the field

of environmental sustainability, but it will also highlight those areas in which students need to improve their skills for the future. Environmental education could not bear the responsibility of protecting the environment alone. Therefore, it would be more effective if economic development had the same concern for the quality of the environment.

3.4 Environmental Attitudes and Behaviours

Environmental attitudes and behaviours have been examined in diverse ways in environmental education and related literature. One of the significant challenges facing attitude and behaviour studies is the ambiguity of these terms. Attitudes and behaviour can be explored for several reasons across different fields and they have been investigated with numerous factors in the field of environmental education. For instance, environmental knowledge, how a person's knowledge about the environmental impacts or influences pro-environmental attitudes and behaviours (Chan et al., 2014; Aman et al., 2012). The behaviour of individuals can be explained with aid of two models; the norm-activation model and the theory of planned behaviour.

Norm Activation Model

Shalom Schwartz propounded the theory of the Norm Activation Model (NAM) (Schwartz, 1977). The idea of the model is an exploration of the functions of anticipated pride and guilt in pro-environmental behaviour. The model outlines three types of antecedents, which act as predictors of pro-social behaviour. These include the knowledge of consequences, the ascription of responsibility, and an individual's norms.

Primarily, Onwezen et al. (2013) argued that a norm activation commences with an individual's awareness of the possible negative environmental consequences or the ascription of responsibility for not behaving pro-environmentally. As a result, the resultant pride or guilt influences an individual to act in a certain way, which aligns to their norms. It implies that pride

and guilt play a crucial role in ensuring self-regulation among people. Moreover, Onwezen et al. (2013) asserted that altruistic behaviour among people is more evident when they have a feeling of moral obligation to align with appropriate behaviour. Additionally, moral obligation is related to awareness of consequences and, among other individuals, it is represented by personal responsibility (De Groot and Steg, 2009).

The theory is a relevant model in influencing the attitudes and behaviours of individuals toward a pro-environment behaviour. Primarily, the school of thought considers that, with access to knowledge regarding an environmental problem, an individual establishes the impact of their behaviour (Paul et al., 2016). As a result, the influence of the individual's behaviour on the problem is identified through assessing the consequences. It may relate to social costs or legal implications. The individual will then establish a comparison between personal behaviour and the ability to make a difference through internal or external motivations (Kroesen et al., 2017). It is mostly affiliation with personal or social norms that defines socially acceptable behaviours. Based on the evaluation, the individual may conduct a cost-benefit analysis in deciding on the appropriate behaviour to adopt. However, with the consideration of moral development, much older individuals are in a better position to make autonomous decisions than young adults, whose decisions are susceptible to peer influences.

Theory of Planned Behaviour

The theory of planned behaviour (TPB) relates to a model that predicts deliberate behaviour. According to Ajzen et al. (2016), the basic premise for the theory is the idea that behaviour can be deliberate and planned. In this school of thought, the behaviour of a person is defined by their intention to engage in a particular behaviour. Additionally, Ajzen et al. (2016) pointed out that the intentions are a function of an individual's attitudes towards the behaviour and personal

subjective norm. As a result, the intention is considered the best predictor of an individual's behaviour (Ajzen, 2015). Primarily, an intention, which embodies the cognitive representation of an individual's preparedness to engage in a behaviour, acts as an immediate antecedent of behaviour (Ajzen, 2015). Furthermore, Tedeschi (2017) asserted that the intention of a person is determined by their attitude towards the specific behaviour, an individual's subjective norm, and their perceived behavioural control. Consequently, particular attitudes towards a behaviour are linked to the ability to predict behaviour, in addition to subjective norms, which represent the views of significant others on engaging in a behaviour. Similarly, perceived behavioural control defines a person's intentions by determining their opinions on the ability to perform particular behaviours. As a result, more ideal attitudes, subjective norm, and high-perceived control of behaviour broadly define an individual's intention to engage in the behaviour in question.

In the context of environmental education, the TPB argues that individuals are engaged in pro-environmental behaviour where there is a positive attitude towards the behaviour. The view that others, for instance, peers and family members, participate in the behaviour; believe that it should be adopted (subjective norm); and feel that they can adopt the behaviour (perceived behaviour control) (Tedeschi, 2017). Moreover, the attitudes of individuals towards the environment serve as a significant predictor of their behaviours. Consequently, the ability to change the attitudes of individuals to a more favourable nature will be instrumental in instituting positive intentions and pro-environmental behaviour (Lu et al., 2016).

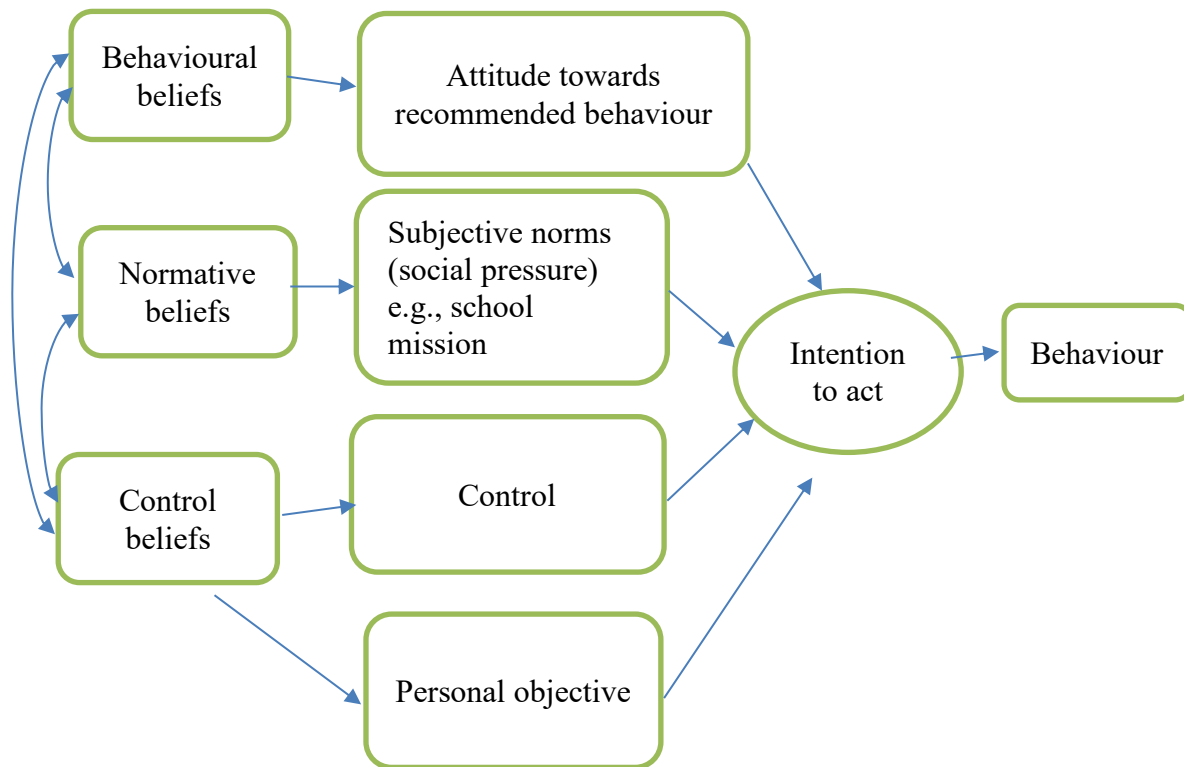


Figure 3. 2: A Model of the Theory of Planned Behaviour

Adapted from: Ajzen, (2015).

3.4.1 Environmental Attitudes

In many pieces of research on adult citizens and their general attitudes relating to pro-environmental behaviour, the term “attitude” is defined as an evaluation (Kusturica et al., 2016; Ignatow, 2006). The environmental attitude can be measured in many ways, however, three ways of measuring environmental attitudes are used widely. These are the ecology scale (O’Donoghue et al., 2016), the environmental concern scale (Folaranmi et al., 2018), and the new environmental paradigm scale (Hermans and Korhonen, 2017). The dimensionality of the environment is vital in forming environmental attitudes, therefore, Borges (2019) mentioned two factors for shaping environmental attitudes; preservation and utilisation. Preservation deals

with the conservation of the environment, while utilisation refers to using the natural resources conforming to anthropocentric dimensions towards the environment. People with the preservation attitude try to maintain the natural set-up of the environment by protecting nature, while people with utilisation attitudes perceive that it is reasonable to use the natural resources of humanity as they were created for this reason. Topics and issues have been identified as “good-bad, harmful–beneficial, pleasant–unpleasant, and likeable–unlikeable” (Ajzen, 2001, p.28). Moreover, Milfont and Duckitt (2010) defined attitudes as a psychological tendency expressed by evaluating the natural environment with some degree of favour or disfavour.

Citizens’ concerns about, or concern for, the environment have been identified in the literature as environmental attitudes. Many studies regarding attitudes focus on factors that may influence adults’ positive, negative, and neutral attitudes toward environmental topics or issues. However, these studies investigated the relationship between attitudes toward the environment and other factors, such as a person’s gender, religion, ethnicity and education (Al-Najar, 2016). These relationships will be studied here to examine the degree of knowledge that Omani students have during their school education years. Moreover, how environmental education impacts on environmental awareness and thus on the development of adults’ pro-environmental behaviours will be considered. However, in this study, three different variables will be examined: environmental knowledge, environmental education (curriculum) and school mission (ethos).

3.4.2 Environmental Behaviours

Runhaar et al. (2019) defined pro-environmental behaviour as “behaviour that consciously seeks to minimise the negative impact of one’s actions on the natural and built world” (p. 240). Blok et al. (2015) and Wong et al. (2018) added that non-conscious acts, such as automatically putting glass bottles or aluminium cans into recycling bins, and indirect actions, such as donating

to environmental causes, should also be considered as part of pro-environmental behaviour. Moreover, Karimi (2019), as well as Harding et al. (2018), underlined that this concept is far from being unambiguous and can only be defined in relative terms that also reflect value judgments. Environmental behaviours in the 29 Minnesota reports on environmental literacy (Murphy and Olson, 2008; Murphy, 2002; 2004) are identified as the adults' self-reported behaviours (daily and longer-term) related to the environment that aligns with this study's environmental behaviours definition.

3.5 Individual Perception of the Environment

In the present society, the majority of people emphasise how the economy performs with cultures structured in a manner that enhances the creation of wealth. However, there is a growing concern relating to the negative environmental implications of these economic models (Ertz et al., 2016; Steg and Vlek, 2009). Globally there has been enormous debate on environment change that is recorded by advanced technology. United Nations Educational, Scientific, and Cultural Organization UNESCO Man and the Biosphere Programme has adopted perception of the environment as a fundamental tool to manage its use. Studies have shown that perceived changes are instrumental in policy design and sustainable resource management (Wang et al., 2014). Individual perception is considered due to the action to be taken concerning the environment. Environmental risk increases personal perception, thus helps in the identification of risk and issues. As a result, a shift to pro-environmental attitudes and behaviours has been considered a viable strategy towards achieving a more sustainable economic system in modern society. Understanding the determinants of an individual's attitudes and behaviours towards the environment has been primarily considered by the researcher and environmental psychologists. The main issue of interest is to determine the impetus of an individual's pro-environmental

behaviour and the role of internal and external factors in determining these motivations (Sawitri et al., 2015). Some of the internal factors include attitudes, beliefs, and values, while external factors relate to reward and punishment systems. Similarly, they consider interpersonal factors such as norms. In achieving a more sustainable system environmental awareness has a great positive impact on the conservation of the environment (Carfora et al., 2017; Bamberg, 2003). Furthermore, human beings resolutely committed to solving the problems evident in the environment may incorporate deliberate measures. These may take the form of environmental protection policies throughout the world. Despite the high level of support for environmental policies and the perceived positive impact in improving ecological behaviour, research indicates that, in the Middle East, a weak correlation between the two factors has been established (Milfont and Gouveia, 2006; De Leeuw et al., 2015). This implies that environmental attitudes and behaviours have limited effects on the ecological behaviour of individuals. Moreover, it is found that an individual's perceptions of environmental problems are markedly distinct and mostly influenced by variables such as concerns over social desirability (Ajzen and Sheikh, 2016). Consequently, this accounts for the disconnect between the instance of self-reported environmental attitudes and behaviours, and the reality of adopting appropriate ecological behaviours.

3.5.1 Approaches to Individual Environmental Attitudes and Behaviours

Since the 1972 United Nations Conference in Stockholm, the lack of public awareness on environmental issues has been a significant concern for pro-environmentalists (Bohdanowicz, 2006; Abidin, 2010). As a result, the Tbilisi declaration in 1977 and the later meeting in 1997 made deliberate commitments to support international environmental education. Educational institutions play a vital role in the process of championing environmental sustainability and development through environmental education (Stevenson et al., 2017; 2007a; Steinmetz et al.,

2016). The process of environmental education does not merely involve knowledge of the environmental and ecological factors, but also includes the relevant skills to promote sustainable pro-environmental behaviours. Similarly, this knowledge aims at developing positive attitudes and societal concern for the environment. As a result, with the growth of individuals' knowledge of environmental issues, there is a positive trend towards performing environmental behaviours (Han, 2015).

This also implies that knowledge and attitudes have a significant impact on environmental sustainability. Developing solutions for environmental problems is based on environmental literacy. De Leeuw et al. (2015) pointed out that environmental knowledge and attitudes have a positive correlation with the development of behavioural intentions towards environmentally friendly products. Similarly, in a study among university students, Paul et al. (2016) observed a positive correlation between attitudes and recycling behaviour. It complements the view that access to knowledge among members of society positively impacts on sustainable behavioural intentions, which translates into sound environmental practices and behaviours.

3.5.2. Factors Influencing an Individual's Behaviour

Natural resources today are being depleted at a faster rate than they are being restored (Aman et al., 2012). Therefore, with the unmanaged use of resources, there are various environmental problems. Moreover, in the world today, some of the significant environmental issues are climate change, depletion of the ozone layer, and deforestation. (Chen and Chen, 2009). Consequently, it is important to establish measures to prevent further occurrences. One of the ways to address this situation is through the education of students about various environmental issues such that they acquire knowledge and information on different environmental concepts.

This will, in turn, enable the students to make critical judgments about environmental issues in the long term (Sengupta et al., 2010 & Courtenay-Hall and Rogers, 2002). Furthermore, for this to be realised, a deeper understanding of the various factors affecting the individual's attitudes and behaviour towards the environment must be taken into consideration. Many theories explain the factors affecting attitudes and behaviour towards the environment. Consequently, this study will be applying the model put forward by Clayton and Myers (2015). According to Steg and Vlek (2009), the factors that affect the individual's behaviour regarding the environment can be classified into two categories: external factors, which are the aspect of the environment or society where individual lives; and internal factors, which are the specific aspects within the individual that influences behaviour towards the environment (Heberlein, 2012).

3.5.2.1 External Factors

The external factors can be broken down into the following specific aspects: affordance, social norms, reinforcement contingencies, prompts, feedback and goals. There is a high-level interest in education in public and the political scene. Environmental issues are so vast that it attracts attention from all quarters and touches on humanity. While interrogating the effect on the environment, one needs to carry out several analyses from the external environment. There is a need for the skill, attitudes and commitment to work towards solutions to problems and prevention of new ones.

3.5.2.1.1 Affordance

According to Sengupta et al. (2010), affordance is the likelihood of action or what is allowed by an individual in the environment in which he or she lives. Hadavi et al. (2015) pointed out that affordances represent the strongest determinant of behaviour. As a result, behavioural affordances largely correlate with the enabling power of the physical or social environment

(Killeen and Jacobs, 2017). Accordingly, the aspect of affordance influencing behaviour can be illustrated better with the use of an example: with the lack of litter bins in the region the possibility of a lot of litter is higher compared to when the litter bins are available (Steg and Vlek, 2009). Therefore, many pro-environmental behaviours can take place (e.g., taking public transport) if the necessary infrastructure is provided (e.g., public transport). As a result, if there are no solutions to the present environmental challenges, people will undertake behaviours not favourable to the environment.

3.5.2.1.2 Social Norms

Al-Maamari (2014) asserts that social norms are a set of laws or behaviour considered acceptable to a group of individuals or the general public. They include unspoken rules or expectations that suggest how people should behave in different contexts. Social norms harness human nature towards the desire to conform and read social cues. Moreover, the theory of normative social behaviour distinguishes two types of social norms: injunctive norms and descriptive norms (Rimal and Real, 2005). The injunctive norms are the extent to which behaviour is supposed to be commonly approved or disapproved of in society, while the descriptive norms reflect the extent to which behaviour is perceived as universal. Also, in the framework of the TPD, a social standard is perceived as the main base for a person to behave pro-environmentally, due to the social pressure that seems to be a significant reason for the person to perform or not perform a behaviour (Bamberg and Möser, 2007). Additionally, fear of social exclusion is viewed as a primary motivation; people tend to fulfil social norms.

However, a study has been conducted on the informational influence of social norms; it is assumed that people frequently follow social norms not because they fear social pressure, but because they use social norms as information about what behaviour is appropriate (Gifford and

Nilsson, 2014). As a result, when individuals are aware of the standard behaviour as perceived by everyone in society, many people will be prone to taking that particular direction. Hence, social norms act as a strong influence on environmental behaviour. Nolan et al. (2008) asserted that social norms dictate the pro-environmental behaviour of individuals. A school mission could be viewed as an example of social norms that form the behaviour of students within school environments. As a result, the ability of a mission to model positive environmental messages influences the overall behaviour of students in enhancing pro-environmentalism.

3.5.2.1.3 Reinforcement Contingencies

Reinforcement contingencies represent rewards or punishments which act as consequences of behaviour (Gilbert and Millenson, 2014). Omomia and Omomia (2014) argued that, in the management of behaviour, rewards are more desirable than punishments in behavioural control. Punishment is used where undesired behaviour is to be discouraged. Simply, a reward system is when ethical behaviour is rewarded, and bad behaviour is punished. Furthermore, the rewards will promote behaviour, whereas punishment dampens behaviour. Hence, this can demonstrate how reinforcement contingencies influence people's behaviour. Reinforcement contingencies are often undertaken by people or bodies in authority, e.g., school administration, government agencies. However, Omomia and Omomia (2014) further asserted, citing Skinner (1953), that punishment creates a trend towards retaliation, escape, or disabling anxieties, hence being less desirable for both punishing agencies and the individual.

3.5.2.1.4 Prompts

According to Steg and Vlek (2009), prompting is the act of supporting people to be able to remember that a particular action is necessary. Similarly, Schultz (2014) pointed out that prompts act as reminders to people of the need to behave in line with the desired behaviour in

different contexts. Additionally, for prompts to be effective, they ought to be positioned near to that behaviour. For example, a prompt requiring people to switch lights off after use should be situated close to the switch. Moreover, prompts should also come out as instructions to be in command of specific behaviour. Some people may purposely ignore prompts and behave in a manner opposing the prompt. This behavioural reaction, according to Ajzen (2011), is aimed at demonstrating autonomy.

3.5.2.1.5 Feedback

Individuals need feedback to assess the effect of adopting certain behaviours (Toner et al., 2014). They want to ascertain if they were able to succeed in performing the behaviour. In some contexts, feedback acts as a reward or motivation for an individual to carry on with the behaviour perceived as desired. By receiving feedback, individuals have an opportunity to improve or gain useful knowledge about past behaviour. The feedback delivered facilitates individuals to monitor their level of success or failure concerning behaviour (Nolan et al., 2008). An example includes a reduction in the cost of the energy for individuals who engage in energy conservation, as opposed to providing a flat rate cost for all.

3.5.2.1.6 Goals

Goals enable individuals to identify the sort of transformation that is necessary. Moreover, goals work jointly with feedback to offer information and incentives for individuals to change behaviours. Through goal setting, individuals can identify the kind of desirable change. According to Clayton and Myers (2015), goals and feedback are effectively used in the process of instituting changes in behaviour. Goals ensure objectivity and deliberate commitment towards the development of pro-environmental behaviour. Furthermore, through feedback, individuals are motivated to sustain the behaviour set out due to monetary and non-monetary rewards.

Furthermore, the theory of goal framing postulates that goals govern the way people process and act upon them (Steg et al., 2014). For example, some goals are designed to change an individual's behaviour at any educational institutions, e.g., schools. However, the current researcher will investigate the influence of the school's goals on Omani students' self-reported attitudes and behaviour. Due to the critical role that any educational institution's goals play in framing the way people behave, it is essential to evaluate the school's environmental goals.

3.5.2.2 Internal Factors

The internal factors that affect the individual's attitudes and behaviour can be classified into knowledge, values, emotions, responsibility and efficacy (Steg and Vlek, 2009; Courtenay-Hall and Rogers, 2002). In contrast to the external factors, internal factors are much harder to manipulate. The impact of educational intervention has both short- and long-term environmental impact. The educational experience creates an emotional attachment to the natural surroundings. The importance of student participation through education over time influences the programme. The changes in environmental attitudes can be altered, and this needs to be evaluated regularly through environmental education programmes. The environmental behaviour that is developed through the knowledge in class can transform the attitude and influence the perception of the environment (Clayton and Myers, 2015).

3.5.2.2.1 Knowledge

Environmental knowledge is defined as a source from which environmental attitudes were formed and behaviour manifested (Kollmuss and Agyman, 2002). However, Kroesen et al. (2017) defined environmental knowledge as "one's ability to identify several symbols, concepts, and behaviour patterns related to environmental protection". Environmental knowledge is a

crucial factor influencing the behaviour of individuals towards the environment. Kennedy et al. (2009) conducted a study in Canada, where it was found that more than 60% of respondents felt that their lack of environmental knowledge often constrained their pro-environmental behaviour. Barber et al. (2009) suggested that a lack of environmental knowledge might urge individuals to make environmentally inappropriate decisions. Knowledge provides people with reasons on which to base their decisions relating to the environment (Heberlein, 2012). As a result, individuals ought to be well-informed about the contemporary threats facing the environment. Furthermore, knowledge is an influential forecaster of environmental behaviour, hence has a strong influence on it (Chen and Chen, 2009). Kollmuss and Agyman (2002) revealed that a more in-depth knowledge of environmental issues and how to solve them increases the likelihood of individuals taking action to protect the environment. As a result, people mustn't be only educated on the threats but also on activities that they can carry out for the environment (Courtenay-Hall and Rogers, 2002). Al-Maamari (2014) pointed out that knowledge is considered a valid and reliable predictor of environmental behaviour. This implies that informing people about the different kinds of environmental threats would significantly determine their change in behaviour (Courtenay-Hall and Rogers, 2002). Leal Filho (2015) argued that, in addition to providing education, emphasis should also be placed on what individuals can do about the problem.

3.5.2.2.2 Values

According to Aman et al. (2012), values are the individuals' principles in life. They represent the general preferences of an individual's ways of acting. They underscore the unique attitudes and behaviour and hence act as a strong determinant of behaviour. Van der Werff et al. (2013) and Poortinga et al. (2004), in their studies about the factors influencing environmental

behaviour, investigated the relationship between the value factor and an individual's environmental behaviour. These studies revealed that values do not have substantial direct effects on environmental behaviour. However, the relationship between universal values and behaviour seems to be mediated by other factors such as specific beliefs or personal norms. As a result, several reasons underlying the existence or adoption of an absolute value will strongly affect environmental behaviour. According to Simaika and Samways (2010), in Kellert's typology of human value for nature, some of the most common values include: utilitarian, naturalistic, ecologist-scientific, aesthetic, symbolic, moralistic, dominionistic, negativistic and humanistic.

3.5.2.2.3 Emotions

Emotions influence the willingness of people to adopt or practise certain environmental behaviours (Sencovici and Costache, 2012). For instance, people who love nature will tend to undertake specific environmental actions, for example, use green energy to reduce the pollution of the environment. Harth et al. (2013) asserted that emotions drive tangible behaviour, hence it has a strong influence on pro-environmental behaviour. Similarly, positive emotions such as love for nature, or negative emotions such as anger, influence how they engage in their environmental contexts.

3.5.2.2.4 Responsibility

Sengupta et al. (2010) asserted that responsibility was the ability to take ownership of a particular activity or action. Therefore, for an individual to undertake certain environmental behaviour, feeling a personal sense of responsibility should exist. Additionally, one of the challenges of encouraging environmentally friendly behaviours is the diffusion of responsibility.

According to Aman et al. (2012), diffusion of responsibility is the logic that another person will offer solutions to the problem. Similarly, Gifford and Nilsson (2014) pointed out that a feeling of personal responsibility in dealing with pollution was primarily affiliated with pro-environmental behaviour.

3.5.3.2.5 Efficacy

Efficacy is the belief of an individual that they can complete an action (Chen and Chen, 2009). It is a crucial factor influencing environmental behaviour since efficacy has more influence than knowledge. Self-efficacy relates to people's beliefs and the ability to complete an action successfully (Schwarzer, 2014). As a result, efficacy has a stronger effect than knowledge and attitudes about predicting behaviour. Additionally, the perceived efficacy of an individual can be reformed to improve pro-environmental behavioural tendencies (Shmuck and Schultz, 2012). This involves providing clear instructions about the measures of protecting and conserving the environment.

3.6 Factors Influencing an Individual's Attitudes

The factors that affect an individual's environmental attitude can be divided into four groups of variables: psychological variables, related environmental variables, social demographic variables, and school-related variables. Consequently, to understand why individuals make a particular environmental decision, an in-depth analysis of the various variables is of importance.

3.6.1 Psychological Variables

According to Rafe et al. (2015), psychological variables are items in the psychological experiments that can be changed. Additionally, the psychological variables are further classified into the locus of control, personality dimensions, social desirability and value. Moreover, the

locus of control is divided into two sets of controls: internal locus of control, which is the ability of individuals to believe that they can control the results of an event; an external locus of control, which are the external factors the individual is not able to control over the consequences of events (Sengupta et al., 2010). Internal locus of control is developed through the knowledge acquired over time of the significance of having a health-conscious environment. It forms a positive attitude towards the environment among individuals who then spearhead the agenda on environmental education as they spread this message to the public. As a result, the internal locus of control has a more considerable influence on environmental attitudes than the external (Ajzen, 2002).

Nevertheless, according to Boon (2016), personality dimensions are the different traits endowed to each individual. Personality traits, which are found to influence the behaviour of individuals, include conscientiousness, extraversion, and openness to experience. It touches more on people's satisfaction with their surrounding environment and the importance of environmental protection. There is a need for proper participation to ensure there is a radical change for the environment. Personality is key to ensuring people are positive and willing to enhance good environmental practices.

Environmental education promotes awareness and protection that will shape attitudes and knowledge. The knowledge later transforms the attitude and develops into an environmental attitude.

Similarly, values are defined as preferred objectives varying in importance, which serve as guiding principles in people's lives (Schwartz, 2012). Many scholars have examined the value-basis of environmental behaviour (Steg and De Groot, 2012; Nordlund and Garvill, 2002). These studies have revealed that individuals subscribe to values beyond their immediate interests that are self-transcendent, pro-social, and altruistic or biosphere values. Many models explain the

dimensions of environmental values. Self-transcendence versus self-enhancement is one of the models (Heberlein, 2012). Many studies have revealed that environmental attitudes are related to the strength of self-transcendence values and self-enhancement values (Steg and De Groot, 2012). Individuals who tend towards self-transcendence value the interests of other people more, while self-enhancement individuals give priority to their interests. As a result, self-transcendence has more positive influences on the environmental attitude, and self-enhancement tends to provide a more negative impact on the environment attitude (Collins et al., 2007).

3.6.2 Environmental Factors

To understand those attitudes that shape behaviour, it is necessary that the influence of attitudes on behaviour is understood. Environmental factors have a profound impact on the attitudes that are demonstrated by individuals. These environmental factors ultimately shape the behaviour of individuals. For developing or changing the attitudes of individuals, the behaviour of individuals exhibited towards the environment must be understood. The theory of planned behaviour mentioned in section 3.8.2 helps change the behaviour and attitudes of individuals towards the environment. Certain environmental factors are used in this regard. These are knowledge of economic conditions and understanding of environmental issues.

Economic factors are usually poorly understood by individuals, and they have limited knowledge related to key economic growth indicators and are unfamiliar with the notion of the economic development index. Some studies found that attitudes towards the environment are negatively associated with economic growth (Zafar, 2016). In contrast, individuals who are affiliated with environmental organisations tend to exhibit more positive attitudes towards the environment (Heberlein, 2012). Furthermore, the inclusion of nature, which represents the level of connectedness of humans to the environment and ecological state, influences attitudes (Martin

and Czellar, 2016). As a result, an individual who experiences inclusion with nature will tend to care more about the environment, whereas an individual who experiences exclusion will tend to care about him or herself more than nature.

Moreover, economic factors do not only influence the behaviour and attitudes of individuals, but they are also used for designing policies for economic development and for changing the behaviour of individuals. Economic policies generate positive or negative attitudes in individuals; contractionary economic policy slows down economic growth, while expansionary economic policy speeds up economic growth, thus moulding the attitudes of individuals positively or negatively by making them better-off or worse-off economically (Kemmelmeier et al., 2002). However, Andersson and Stage (2018) investigated the effect of pay-per-bag policies; they stated that the bag fees did nothing to reduce the weight of disposal material in some countries and has only increased the recycling rates slightly. Moreover, knowledge of environmental issues influences environmental attitude as evidenced in the sense that individuals with more knowledge will tend to care more about the environment than those with less knowledge (Martin and Czellar, 2016).

3.6.3 Social Demographic Factors

Demographic factors also trigger environmental attitudes and are influential in changing the attitudes of individuals. These factors include: age, gender, social class, religion, level of education and residence. Age contributes to environmental attitudes because maturity changes many things and is reflected in a person's behaviour. A mature person is more responsible for the conservation of environmental resources (Aman et al., 2012). Additionally, research around gender indicates that females care more for the environment than the males. McCright (2010) reported that women are more emotionally engaged, more environmentally concerned, and are

more willing to change. However, other scholars have stated that women have less extensive environmental knowledge than men (Mostafa, 2007). These differences may be due to the different socialisation patterns of boys and girls (Buckingham, 2005).

Education is one of the most influential variables for explaining the level of environmental attitudes and behaviours (Zilahy and Huisinigh, 2009). Moreover, findings of the research also show that individuals who are better-educated care more about the environment compared to those less well educated (Agyman and Kollmuss, 2002; Sengupta et al., 2010). Valinas et al. (2010) pointed out that general environmental knowledge and specific skills are often acquired through the stages of the education system. Similarly, the results of the study conducted by Vicente-Molina et al. (2013) showed that the level of education and knowledge are significantly and directly related to each other. This is the case because more educated individuals become more aware of the threats posed by environmental degradation. Individuals with higher levels of income have a more positive environmental attitude (Sengupta et al., 2010).

3.6.4 School-related Factors

The school environment has a significant influence on the ability to encourage students to follow sustainable environmental practices. This study considers some of these critical features inherent with the school to determine the self-reported attitudes and behaviours among students. These are vital indicators that act as significant metrics of environmental education and practices. These factors are crucial in determining the internal factors as they transform the individual into having a positive attitude towards the environment (Lin and Shi, 2014). Moreover, Heberlein (2012) stated that these factors induce motivation among students for competence. Students exhibit different attitudes towards learning, school and motivation due to contextual and cultural

experiences. Students' construction of meaning towards school and motivation depends upon the familiar skills that are learned in the school through the school's culture (Lin and Shi, 2014; Chen and Chen, 2009).

Therefore, students in all social, economic, and cultural contexts must have equal opportunities (Choudri et al., 2016). The reason behind accessing equal opportunities lies in the values of family and community because these two institutions help in creating the value of school and learning, so that future projects for students can be aligned to the education provided in school. Not all students are the same; some pupils develop an attitude of feeling less competent compared to other more intellectual students, which results in negative expectations related to future projects. Al-Jubouri and Al-Jubouri (2019) mentioned that these negative attitudes develop negativity towards schools and learning because self-perceived motivation decreases due to feeling less competent.

Nevertheless, certain challenges pose hurdles in the learning process of students (Dillon, 2016) (see figure 3.3). No two minds are alike, therefore, the situation may arise that a student's learning process is different from the teacher's, or they may interpret the context differently from their teachers. This factor also plays an important role in the learning process of students.

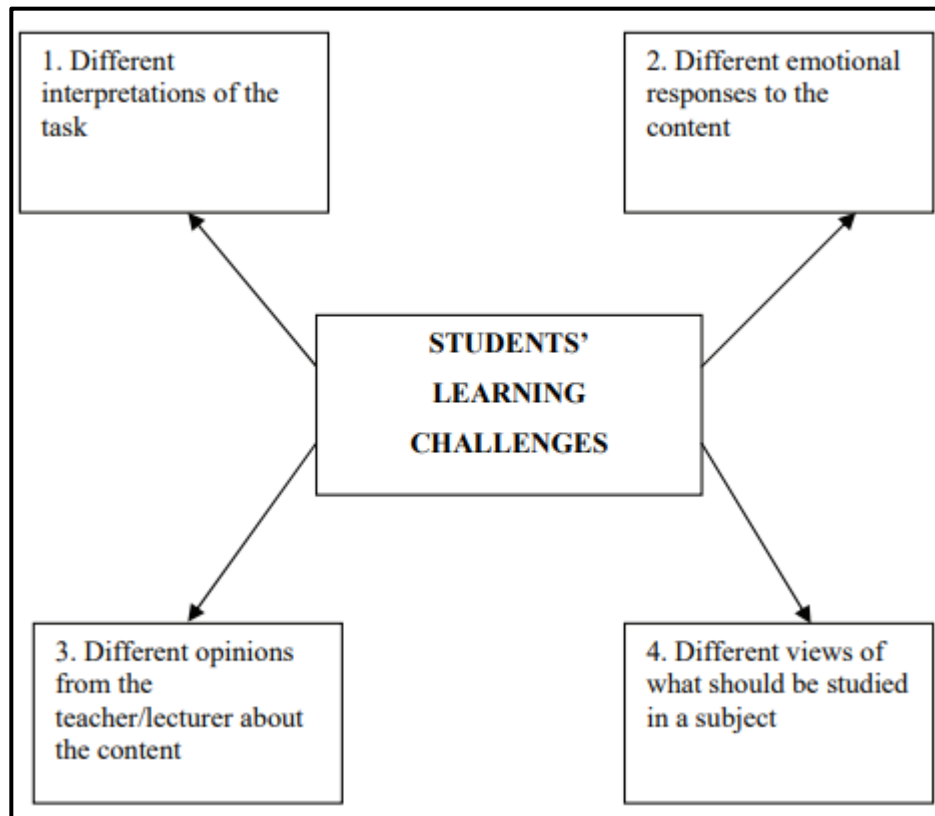


Figure 3. 3: Learning challenges experienced by students in environmental education

Furthermore, apart from the general factors that affect the attitude and behaviour of individuals, there are specific factors within a situation that affects the attitude and behaviour (Lin and Shi, 2014). For instance, in a school setting, the following factors influence the attitude and behaviour of students towards the environment: school ethos (mission), school environment curriculum (education) and students' environmental knowledge (Mansour et al., 2018). The school mission states the values and morals of the school to be practised and achieved (Lin and Shi, 2014). As a result, if the values and morals are focused on conserving the environment, they will influence the students in that particular direction. Additionally, the content of the curriculum

will also determine the attitude that students will have on environmental aspects (Chen and Chen, 2009).

3.7 Instruments to Measure Individual Behaviour

Students and all humans today have participated in environmentally damaging behaviour in school, the corporate world, government or society. This has directly led to environmental problems in the world today, which pose a severe threat to all of humanity. Nations are convening every year to deliberate on the looming issue of how to handle the environmental dangers that the world is likely to experience if they are not carefully mitigated at an early opportunity (O'Riordan, 2014). It is, therefore, paramount that all people are aware of the environmental challenges facing the world. The institution of learning has now been used as a centre stage in instructing young people of the importance of the environment, which in turn will help to address these problems. The goal of providing environmental information is to prepare students to play an active role in displaying environmentally friendly behaviours. Researchers advise that environmental education both in schools and outside schools helps to protect and conserve the environment, and will encourage a better quality of life.

There is a need to collect quantifiable information to enable environmental officials to plan and forecast for the future. According to Dohmen et al. (2011), finding the reasons why students do not practise ethical behaviour towards the environment will help uncover and analyse the barriers. Useful findings on individuals' behaviour would go far in helping policymakers establish how to change the behaviour. According to Iwaro and Mwasha (2010), many institutions have considered ecological and human welfare implications while coming up with principles and guidelines. However, student ethical behaviour needs to be taken into

consideration on the issue. There is an increased number of products in the world today that make environmental claims. The number of studies on ethical practices is also growing.

3.7.1 Observational Research

Observational research focuses more on student's actions than what they claim they do. The use of technology has become significant and provided a boost in observational research in assessing individual behaviour, for example, scanner tracking and the recording of internet purchases. However, the shortcomings are the small numbers of users and difficulties in implementing the method (Pringle and Clayton, 2010). The use of observational research in conducting a study allows the collection of objective data based on real-life activities. It is essential in delivering reliable data and analysis of an individual's behaviour.

3.7.2 Self-reports Scale

The self-reports scale will be utilised in conducting the current research due to its appropriateness in measuring the attitudes and behaviours of individuals. Self-reports are used to describe and measure attitudes and behaviours relating to the environment (Milfont, 2009; Chao and Lam, 2011). This approach is considered adequate due to the ease with which data can be collected and interpreted using well-structured questionnaires and interviews. This is done through the preparation of a questionnaire asking questions related to the environment. The respondent reads the questions presented and responds to them independently without interference (Pringle and Clayton, 2010). It is, however, assumed that these self-reported behaviours reflect an individual's actual behaviour and, therefore, can accurately predict their attitudes and behaviours towards the environment in the future.

A series of studies have focused on reporting the link between social desirability and positive responses to environmental and social responsibility (Reid et al., 2005). As a result, the instances of self-reported measures in attitudes and behaviours concerning the environment have been closely linked with environmental education. Hines et al. (1987) opined that the correlation between revealed behaviour and attitudes is higher than the correlation between self-reported behaviour and attitudes. Smith (2005) asserted that for decades, social scientists have been making inferences with regards to people and what they are like. This involves the measurement of some sort of hypothetical constructs to wholly comprehend human behaviour. As a result, Smith (2005) pointed out that it is important to measure this hypothetical construct convincingly. Similarly, Robins et al. (2007) argued that the degree of accuracy in the use of self-reported data in evaluating people's personalities and behaviours should be evaluated to ensure the validity of the test. Because the method relies on the accuracy of self-reports from respondents, hence their unwillingness to maintain objectivity could compromise the validity of the study. However, despite the challenge in measuring these hypothetical constructs, self-reports offer a wide degree of reliability and validity in the process. The approach presents a range of advantages to the respondents and the researcher. Primarily, in using self-reported questionnaires, there is a high degree of simplicity in providing feedback and interpretation of the data. In the same manner, the method also allows the researcher to collect more extensive data on people's personalities and attitudes while ensuring the confidentiality of respondents' feedback (Paulhus and Vazire, 2007).

3.7.3 Consumer Ethics Scale

The consumer ethics scale inspects the extent to which students believe in certain behaviours that are termed as questionable. DeWaters and Powers (2011) argued that there is often a failure

in appreciating that intentions are not an entirely reliable proxy for actual behaviour. There is a disconnect between the action and the intention of the consumer. Using the method in conducting a study will facilitate the researcher to evaluate the correlation between an individual's behaviour and their behavioural intention. However, the method is limited by the subjective nature of attributes such as ethics, which rely heavily on the accuracy of information provided by the respondents.

3.7.4 Socially Responsible Consumer Behaviour

Freeman et al. (2014) argued that past behaviour is a good record of measuring the present or future behaviour. This scale suggests the respondent reports on their past and present behaviour as opposed to their future behaviour. Similarly, Bulu (2012) argued that assessing a person's social behaviour on social dimensions would amount to solving it. A major limitation to the approach is the overreliance on secondary data (historical facts) to determine future behavioural trends. Despite the reliability of this type of data, it fails to appreciate the changes over time that may make its interventions redundant in contemporary society.

3.7.5 Environmental Education as a Tool to Measure Behaviour Attitude

One of the significant purposes of educating students on environmental issues is to inform them of the importance of the environment and the need to be responsible for it. A study by Hargreaves (2011) argued that the materials used in learning institutions are geared towards inspiring students with the need to value the environment. The findings demonstrate that a student with good attitudes towards the environment is more likely to develop a positive mentality and subsequently perform well in their studies. Some of the contributions are the preservation of natural resources, water conservation, and reduction in environmental pollution,

among others. Education instils knowledge on the importance of the environment, thus encouraging people to come up with policies and strategies geared towards solving environmental issues.

3.8 Chapter Summary

The prior studies reviewed in this chapter indicate that certain factors affect the attitudes and behaviours of students towards the environment. Certain factors trigger positive attitudes among students to make efforts for the conservation of the environment. However, external factors alone are not responsible for the demonstration of positive attitudes; the individual's perception also plays a vital role in pro-environmental attitudes. The scope of environmental education in the Sultanate of Oman and the efforts that are put forward by the government are contributing to designing initiatives to provide environmental education to all and make it accessible to everyone. In addition, this chapter covered the meaning of environmental concepts, the aims of environmental education, and the characteristics of environmental education.. Moreover, some challenges faced by Oman in terms of environmental attitudes and behaviours are discussed in detail.

While research on environmental education spans various fields, there is a need for research that addresses some important questions. Firstly, the current self-reported survey research is the first study conducted in Oman looking at students' environmental attitudes and behaviours; no previous studies have been done in Oman on this topic. This study is more quantitative, seeking basic information. More can be gleaned from the experiences and insights of students, teachers, and heads of schools than just basic facts. Their reactions to policies and educational systems or programmes could prove useful in evaluating results. Secondly, the research that has previously been done did not ask students, teachers or heads of schools about their perceptions or awareness

of definitions of environmental education. Students', teachers' and heads of schools' perceptions could allow for an understanding of their awareness of environmental education. Participants' perceptions of environmental education could show their environmental awareness. The perceptions of students could prove useful in assessing how teachers and administrators deal with or encourage pro-environmental behaviours in schools, while the perception of teachers and heads of schools could provide insight into why they think their role as a teacher or head of school influences students' environmental attitudes and behaviours. It also proves useful in determining the school factors that influence students' self-reported environmental attitudes and behaviours. Thirdly, this study is the first to have conducted an environmental knowledge assessment with Omani school students to assess their level of environmental knowledge. Thus, the current study seeks to cover these gaps in the existing literature.

CHAPTER 4: METHODOLOGY

4.1 Chapter Overview

This chapter outlines the theoretical framework and presents the methodology and methods employed to explore and explain the phenomena of environmental education in the region of the Middle East, especially in the Gulf Cooperation Council countries. In addition, it outlines the procedures and the outcomes of the pilot study, followed by the methodology adopted in the process of data collection and analysis, and then the presentation of key findings. This chapter also considers aspects of reliability and validity, and the ethical considerations made in undertaking this study.

4.2 Theoretical Framework for the Research Design: Pragmatism

4.2.1 Pragmatism

Constructing a methodology that would best address the research question is an important element in determining whether an inductive or deductive approach would be implemented in the research design. As noted, when identifying the research problem, there would be no predetermined conjecture or hypothesis regarding what factors related to schools that may determine students self-reported environmental attitudes and behaviours in the selected school. Because this research seeks to build knowledge and understanding on a social issue, it was also essential to establish an epistemological and ontological position in determining a suitable methodology for answering the research questions of this study. The research philosophy adopted in the study is pragmatism, which implies the deconstructive paradigm that favours the use of mixed methods in research.

Pragmatism is derived from a Greek word “pragma” which means action. Thus, it rejects traditional theories regarding truth, nature of explanation, and inquiry (Gale, 2005). Pragmatism was founded in the late 19th century by American philosopher Charles Sanders Peirce (Baert, 2005; Shusterman, 2016). However, despite the significant contribution of all scientists in the development of pragmatism as a philosophical movement, the substantial influence in pragmatism came particularly from George Mead, whose contribution influenced psychologists and social scientists. He created the theory of “Presentism”, which means what is real is happening now (Bourne, 2006).

Pragmatism represents a research philosophy that accepts concepts as relevant based on their ability to support action. In this paradigm, there are different approaches to interpreting the world and conducting research (Morgan, 2007; Feilzer, 2010). In the ontological perspective, this implies that no single aspect can ever portray the entire picture and that there is always more than one reality. In the context of pragmatism, the crucial determinant of the research philosophy is the research question. Consequently, pragmatism combines both positivism and an interpretive approach to develop one research philosophy for a single study. According to Teddlie and Tashakkori (2009), pragmatism overlooks the contentious issues relating to truth and reality, while placing more focus on the approach that works as the truth concerning the research questions under investigation. As a result, it rejects a position among two contrary perspectives.

The use of pragmatism in research allows the adoption of mixed methods and triangulation, which yields some significant merits for the researcher. Primarily, it provides strengths that compensate for the weaknesses of using the qualitative method or quantitative method on its own (Gale, 2005). Similarly, the approach allows the avoidance of bias often attributed to qualitative research. The researcher may analyse data based on individual preferences, hence compromise the validity and reliability of the findings (Feilzer, 2010). As a result, by combining both quantitative and qualitative methods, pragmatism ensures more valid research in certain circumstances. However, despite the benefits attributed to pragmatism, it takes more time and an intricate research design that requires specific skills of the researcher. In a mixed methods approach, the researcher builds knowledge on pragmatic grounds (Blok et al., 2015; Creswell, 2003; Maxy, 2003).

Thus, the researcher is inclined to adopt a mixed approach of qualitative and quantitative methods to investigate the determinants of Omani students' self-reported attitudes and behaviours toward the environment and environmental issues. Teddlie and Tashakkori (2003) described pragmatism as “debunking concepts such as ‘truth’ and ‘reality’ and focuses instead on ‘what works’ as the truth regarding the research questions under investigation” (p.713). Pragmatism is a combination of scientific empirical approach and the “freewheeling” inquiry of the qualitative approach (Shusterman, 2016). Pragmatism is about practicality; the outcome is what matters and truth can be understood based on actual results and outcomes. Given that this study aims to identify the factors that determine students' pro-environmental attitudes and behaviours, pragmatism helps to explore students' actual pro-environmental attitudes and behaviours. Actual results and outcomes of phenomena represent part of the truth of that phenomena.

Many of the existing theories, such as, individualism and social constructivist theory, use logical reasoning to explain human, social and psychological activities. But what if the actual outcome of a question contradicts the explanation provided by the theory? What if what is happening does not fit with the logical reasoning of the theory? Pragmatism is one approach to answer these questions. Pragmatism is intellectual reasoning based on actual outcomes of an event, activity, or phenomenon. It is about investigating practical actions and outcomes and determining the best possible explanation for each action individually. Pragmatism combines both quantitative scientific approach and the enquiry of qualitative research theories (Teddle and Tashakkori, 2009). Therefore, pragmatism is the most suitable philosophy and ontological position from which to investigate the questions of this research, because it enables the researcher to investigate the problem using both quantitative and qualitative approaches.

As stated earlier in this section, the ontological and epistemological positions have to be clearly defined to answer the research questions. Pragmatism provides half of the answer and the other half is provided by the epistemological position. This research aims at investigating students' self-reported environmental attitudes and behaviours. It evaluates whether awareness, knowledge, intention, and attitude transform into action or not. For this purpose, the Responsible Environmental Behaviours (REB) theory is used as an epistemological research position. REB explains that knowledge, intentions, and attitudes are behavioural dispositions, and these behavioural dispositions are irrelevant to the real world unless they translate into action (reality). Thus, REB implements the general philosophical framework of pragmatism, since pragmatism focuses on activities as a means to understand the world. The next section discusses in more detail the underlying concepts of REB theory.

4.2.2 Responsible Environmental Behaviour

Responsible Environmental Behaviour theory was developed by Hines et al. (1987). It evaluates whether awareness, education, intention and attitude transform into action or not. According to the model, increasing knowledge amongst individuals translates to more favourable attitudes, which in turn promotes appropriate actions towards the environment. As a result, greater access to the natural environment is mostly linked to increased sensitivity and awareness of an individual's impact on the environment (Karimi, 2019). Additionally, through creating awareness, an environmental ethic is developed, which creates an intrinsic motivation for conserving energy and reducing the impact on the environment. In the analysis by Harding et al. (2018), it is determined that many psycho-social variables are affiliated with REB. According to Ertz et al. (2016), the factors include: expressed intention, locus of control, attitudes, personal responsibility and knowledge, in order of decreasing strength.

Moreover, the REB model considers that intentions play a central role in motivating and impacting behaviour. Consequently, they remain as behavioural disposition until the opportunity arises when the purpose can be translated into action. This implies that intentions are irrelevant unless they transform into actions. Plans act as a significant behaviour predictor towards action tendencies. According to the model, the intentions determine the actions, ranging from the trivial to those considered of high personal and social significance (Hines et al., 1987). The next section discuss Student- Centred Approach and its practices in Teaching in Oman.

4.2.3 Pedagogy Theory: Student-Centred Constructivist Approach (Dewey's Views)

John Dewey is viewed as the outspoken pragmatist, especially on topics related to education, politics, and world peace (Shusterman, 2016). He was the first to develop the notion of outcome learning. He believed it was vitally important that education was not merely the teaching of dead facts, but the skills and knowledge that students learned by being fully integrated into their lives. Learning by doing is an educational concept that emerged from Dewey's pragmatist views (Peters, 2010). It is another reason why pragmatism serves as the best theoretical option to investigate the questions of this research. In this sense, the researcher is trying to investigate the actual actions of environmental education in Oman as reported through students' self-reported attitudes and behaviours.

Students-centred constructivist approach derives from Dewey's pragmatism philosophy in the last few decades (Phillips, 2000). Student-centred approach implies that students is the centre of the learning process through enhancing students' critical thinking and their abilities in problem-solving skills (Richardson, 2003 and Peters, 2010). Moreover, this approach believes more on the skills students gain and the practical experiences through the learning process.

The movement from Teacher Transmission Knowledge to Student-centred is seen in Omani schools within the new reformation of education system; the basic education system (MOE, 2019). Encouraging students to participate in activities at schools and also on the projects that are combined within the schools' subjects. Additionally, if students are required to develop and apply skills regarding environmental issues, it will help them to make their own decisions and at the same time to think critically about their choices and the consequences of their decisions (Courtenay-Hall and Rogers, 2002; Jensen, 2002). Therefore, engaging students in practical programmes to face environmental problems and to learn how to solve environmental issues, in reality, is an essential step towards raising students' knowledge and improving their attitudes towards the environment. Al-Balushi and Al-Aamri (2014) conducted a study in Oman to

explore the effectiveness of involving students in environmental science projects for their environmental knowledge and attitudes toward science. The result showed that students' involvement in environmental projects had a statistically significant positive impact on their environmental knowledge and science attitudes. The knowledge acquired from the educational programmes transforms the attitudes of the students. The government has to come up with policies that use the knowledge acquired, and strategies that seek to solve environmental issues. Some of these strategies are giving students the opportunities to participate in environmental issues competitions at nationals; and internationals' levels.

In respect to the methods of teaching environmental education through the integration of science education, project-based learning is an effective method to enrich students' environmental knowledge (Jensen, 2002; Turgut, 2008 and Tal and ALKaher, 2010). Also, Turgut (2008) observed that the knowledge and skills that students get out of their participation in different science projects prepare them to take appropriate positions in science-related social discussions and negotiations in and out of the classroom. Thus, this sense of personal responsibility that students gain influences the quality of the environment and their lives; through their decision on the choice of environmentally friendly products and lifestyle (Jensen, 2002).

At this stage, it is essential to identify research approaches and define the most suitable and relevant research variables, which then address the proposed research questions and ultimately provide some findings and explanations to these questions. The following section will present the approach adopted in the study.

4.3 Research Approach

In a deductive approach, a hypothesis is developed based on a pre-existing theory and, subsequently, a research approach is formulated to test the hypothesis. This strategy is appropriate where the research study aims at examining if the phenomenon observed effectively fits with the expectations as informed by previous research. This approach may involve the use of statistical analysis to test the hypothesis and ultimately the development from general to particular (null and alternative hypotheses need to be tested statistically using the t-test to evaluate whether the predetermined theory could be accepted or rejected).

The inductive approach develops from specific to general. The researcher makes an observation that acts as the starting point. Observation then leads to the fact that data is collected to generate a new theory (Creswell, 2011; Ajzen and Sheikh, 2016). Based on the distinctive criteria between the inductive and deductive approaches mentioned above, the inductive method is not best suited for the current study on attitudes and behaviours, therefore, this study is adopting the deductive approach. Based on previous literature, many factors may influence school students' environmental decisions and choices (Steinmetz et al., 2016). However, some factors that are expected to have an impact on students' environmental attitudes and behaviours have not yet been deductively investigated in Oman, for example, factors such as school mission, ethos, environmental education, and ecological knowledge. This study uses a deductive approach to test our hypothesis about the factors that determine students' pro-environmental self-reported attitudes and behaviours.

4.4 Research Design: A Mixed Methods Sequential Explanatory Study

For conducting this research, a mixed methods approach using sequential phases (see figure 4.1), In this approach, quantitative data is first collected and analysed; a subsequent

process of collecting qualitative data is initiated to understand the research problem in a comprehensive manner (Creswell, 2002; Harrits, 2011). The justification of using a mixed methods design is that sometimes, due to the nature of the topic or an event of the study, it is very challenging to capture all aspects related to that topic by either quantitative or qualitative methods. Therefore, using mixed methods will help to overcome the limitations of each of the quantitative and qualitative approaches, and enhance the quality of the analysis (Greene, 2007). A major view of pragmatism is that quantitative and qualitative methods are compatible (Cohen et al., 2017; Feilzer, 2010). Therefore, for this study, quantitative and qualitative data has been collected sequentially.

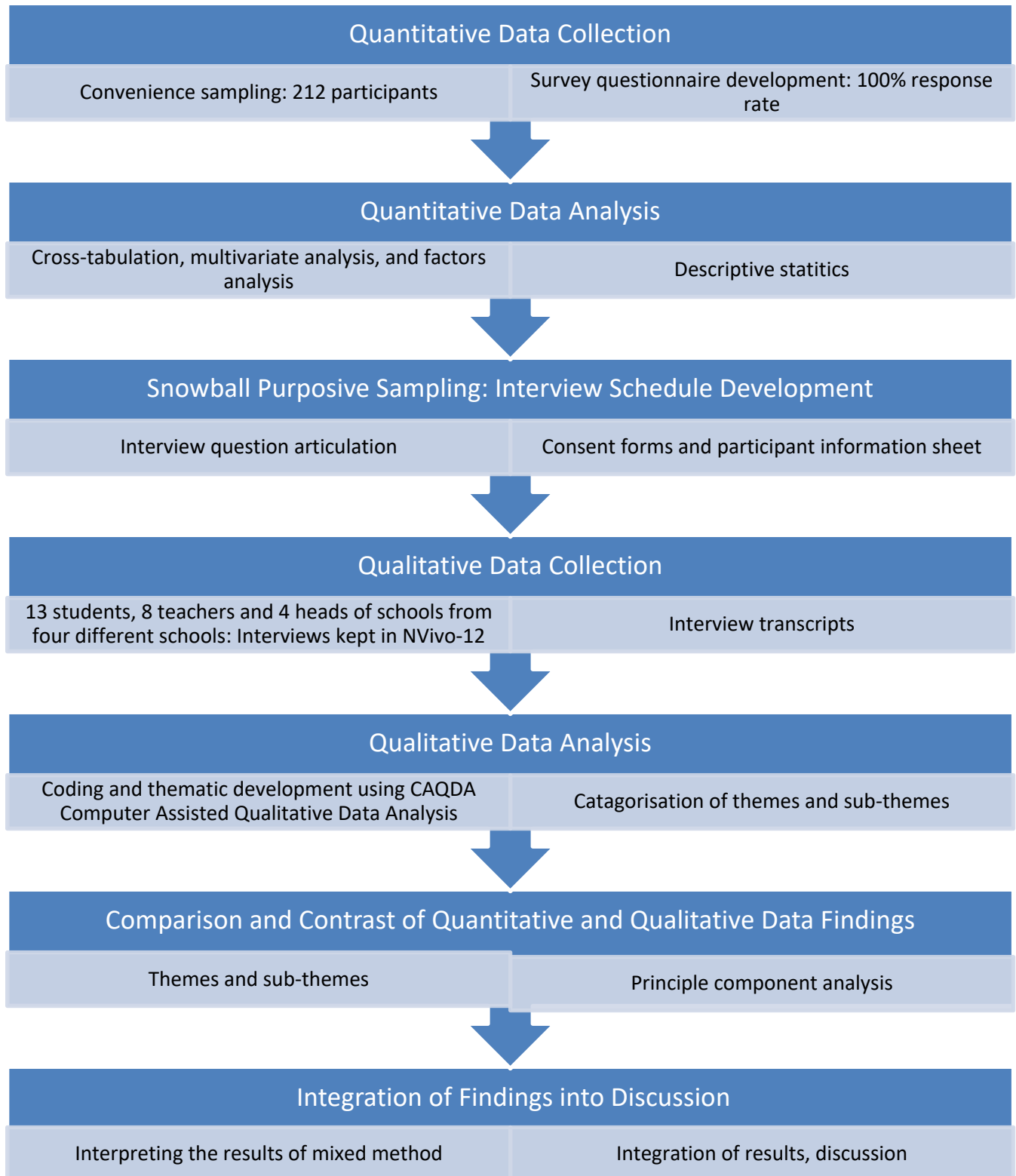


Figure 4.1: *Mixed method sequential explanatory model*

Moreover, while designing the mixed methods study, three factors need to be taken into account: priority, implementation and integration (Fetters et al., 2013; Creswell and Poth, 2017; Greene, 2007). Priority refers to methods that are either quantitative or qualitative. In this research, priority is given to a mixed approach; for instance, both quantitative and qualitative methods are used to justify the aims of this research. The quantitative approach is used for seeking reliability and validity of the results so that meaningful conclusions can be drawn quickly, while the qualitative approach is used to construct the theoretical background of this research so that the researcher must know which theory has been tested and the difference between the theory and the results of the quantitative approach. Collection of qualitative data provides an initial understanding of the phenomenon through adopting the thematic analysis approach. Implementation refers to whether the quantitative and qualitative data collection and analysis come in sequential or chronological stages, one following another, or in parallel or concurrently. As far as the implementation phase is concerned, the information is collected from participants in the form of sequential data so that the data can be easily categorised into themes and sub-themes for the purpose of analysis. The third factor is integration, which refers to the phase in the research process where the mixing or connecting of quantitative and qualitative data occurs (Fetters et al., 2013). The study will adopt one of the most popular mixed methods designs in educational research: sequential explanatory mixed methods design (Creswell, 2014; Creswell et al., 2003).

The sequential explanatory research design works well with a mixed method research that includes both qualitative and quantitative analysis. The aim of collecting qualitative data is to elucidate further and provide an in-depth explanation of the quantitative results (Cohen et al., 2017). As a result, quantitative data is considered as the primary focus for the study, while the qualitative data is deemed to be secondary to support the primary. This analytical method

implies that the qualitative data enhances the statistical data in the study, while further explaining the observed behaviour related to the general phenomena (Terrell, 2012).

Moreover, in this study, a quantitative survey was conducted involving the use of a questionnaire to collect data from the students. In addition, conducting the survey helped the researcher to get an insight about the impact of schools' vision and mission, environmental education courses, and environmental knowledge, on students' pro-environmental self-reported attitudes and behaviours. Furthermore, by conducting the interviews, the researcher collected rich data that allowed better interpretation and explanation of the findings of the survey. Interviews enabled the researcher to probe further on areas of interest, hence receiving more feedback related to the actual description of the respondent. In other words, the interviews would investigate in more detail why some students behave differently from others, how each factor impact students' pro-environmental behaviour, and what motivates students' pro-environmental behaviours other than the factors specified in the survey. As a result, the rationale for using the design in the study relates to the degree to which it extensively synthesises data and uses it to provide an in-depth explanation of the phenomena within the survey.

The research design consists of two distinct phases. The first phase involves collecting and analysing the quantitative data to evaluate students' self-reported pro-environmental behaviours, measure the relationship between the identified factors and students' self-reported attitudes and practices, and to identify students' environmental knowledge sources. The first phase allowed for purposefully selecting informants for the second phase.

The second phase involves designing, collecting, and analysing interviews. Various research instruments were used to collect data in this study, namely, a form of a closed questionnaire and semi-structured interviews. The variations in data collection approaches of this study enable the researcher to answer the research questions and enhance the understanding

of the issues raised in this research. The quantitative part seeks to investigate and identify the environmental attitudes and behaviours of secondary school students in Oman, and to measure the relationship between the factors related to the school and students' self-reported attitudes and behaviours towards environmental issues. Also, the survey was used to identify the sources of students' environmental knowledge. The qualitative approach collected textual data through individual semi-structured interviews (Marshall and Rossman, 2014). The interviews would be semi-structured, meaning that deviation from the interview schedule was possible to allow for probing and asking, "follow up questions to elicit further description" (Roulston, 2010, p.14). The semi-structured interview approach is the most suitable one for this study as it focuses on "how the interviewee frames and understands issues and events" (Becker et al., 2012, p.471), therefore, allowing the interviewer to explore directly what Omani students consider the most important factors related to school that influence their pro-environmental attitudes and behaviours. The semi-structured interviews were designed to enable the researcher to have a better, in-depth understanding through using open-ended questions. It also allowed the researcher to ask questions. In other words, the interviews would help to explain the findings of the questionnaires. The qualitative data from interviews were explored in depth and helped to identify the school's factors that influence students' environmental attitudes and behaviours within and outside Omani secondary schools.

Overall, the implementation of sequential explanatory mixed methods design made the study strong and allowed for capturing more detail. However, there are still some limitations for this approach such as: it requires plenty of time to be completed and a wide range of resources to collect and analyse both types of data (Castro et al., 2010).

4.5 Pilot Studies

4.5.1 Participants and Location

The pilot study was conducted in Muscat, the capital city of the Sultanate of Oman. Muscat city was selected because of easy access to the selected schools, in terms of transportation and communication, and also because the researcher of this study has worked at these schools since 2011, which made the procedures for conducting this study much easier. The characteristics of the selected city are discussed in greater detail within the inclusion criteria of this research in the targeted sample and site section 4.7. A total of five students from each grades 10 to 12 participated in the pilot study. While selection procedures were based on convenience, care was taken to ensure that participants were selected to represent the various aspects that are important to this study in terms of age, gender, level of education, school grade and geographical location.

4.5.2 Pilot procedures and activities

Various techniques were used in conducting the pilot phase of this study, including administering a structured questionnaire with five students and conducting interviews with two teachers. Additionally, before the actual data collection, the researcher piloted the questionnaire form to a class of 26 students in a secondary school in Muscat. It took around 45 minutes for the students to answer the questions.

4.5.2.1 Structured Questionnaire

The use of structured questionnaires and an environmental concern scale was pilot tested before use in the study. This was essential in ensuring the credibility of the collected data. Similarly, the pilot study facilitated the testing of the instruments to determine several

limitations that may be faced in the research. Moreover, the insights from the pilot study offered suggestions to improve the questionnaire and the whole study process (Dörnyei, 2007). The pilot phase of this study was conducted between September and October 2017 for approximately six weeks. The survey was sent out by email to several students who were not part of the current study and also to the sample, to avoid item dependence as much as possible and to examine if there were any vague statements in the questionnaires before launching it.

The respondents took around two weeks to return their answers. Two students completed the survey in 20 minutes, and the other three students took approximately 32 minutes. Moreover, students sent some comments concerning the knowledge questions. One of the respondents indicated that her environmental knowledge was weak, and she faced some difficulties in answering some of the ecological knowledge questions. The other four of them suggested that the knowledge questions were easy to understand. Regarding the structure of the questionnaire, all respondents informed the researcher that the structure of the survey was good, and the instructions were clear and easy to follow. Since four of the five students indicated the questions were easy to understand, the researcher did not make any changes in the environmental knowledge section.

4.5.2.2 Interviews

The interview was piloted with two teachers in February 2018. Interview questions were pilot tested before the actual interview took place in Oman. This helped to determine the amount of time needed to conduct each interview and to organise the interview plans for each school. Moreover, the piloting helped to refine the forms of some questions. A discussion took place with both teachers regarding the best time for conducting the actual 25 interviews in Oman; both teachers recommended that they take place at the beginning of the second semester, which started in the middle of February 2018.

4.6 Data Collection Methods

Regarding data collection, the questionnaire was distributed on paper to the target sample personally by the researcher of the current study, and not through emails or other online means. This ensured that the questionnaire was answered by the targeted students. Secondly, the interviews were conducted face-to-face between the researcher and the participants after the quantitative data were analysed. Before the questionnaire and interviews being started, the researcher briefly explained the purpose of the study to the sample group and subsequently acquired consent from all participants. In the consent form, participants were informed that the survey was anonymous. Data collection for quantitative data took four weeks and for qualitative data 7 weeks to be completed. The interviews were collected by giving participants an interview information sheet that mentioned the aim, scope, and purpose of the research. The data was collected in the form of semi-structured interviews so that the aim of the study was fulfilled successfully, and there was a minimum chance of deviation from the phenomenon under study. Christensen et al. (2011) stated that a semi-structured interview keeps the interviewee restricted in the research, and they would then give the precise and relevant answers, which are easy to process. However, Taylor et al. (2015) stated that close-ended questions in the structured interview do not provide the autonomy to interviewees to give detailed answers. The interviews lasted for 30 minutes, and the whole interview session was recorded on an audio tape for further referral so that no vital information could be left out while processing the information gathered from interviews.

Before the collection of the quantitative data, participants were asked some demographic questions about themselves. Patten (2016) noted that collecting demographics highlights characteristics of individuals that are important variables in research and are often attributed to

affecting individual outcomes. Demographics of participants of this study include age, gender, educational level, location of the house (rural or urban), and the school's name. The data obtained by administering a structured questionnaire totalled 53 items distributed across 30 questions to secondary school students from grades 10 to 12, aged 15 to 18. This involved submitting questionnaires to the respective schools by hand from 11 October to 20 November 2017.

The structured questionnaire was designed to address the four key issues, namely: environmental attitudes, behavioural intentions, factors affecting environmental attitudes and behaviours, and the level of environmental knowledge. In measuring opinions, the environmental concern scale was adopted in the study. At least four items from the scale considered relevant to the Sultanate of Oman were chosen in measuring the attitudes of the respondents. Similarly, a five-point Likert scale was adopted in measuring the behavioural intentions of the students. The scale ranged from “strongly disagree” to “strongly agree”, hence pointing to the level of willingness of the respondents to engage in pro-environmental behaviours.

A list of aspects of pro-environmental knowledge, attitudes, and behaviours were developed and scored based on the respondents' responses. These include items such as what they know about environmental issues such as global warming and what would they do to reduce it. As the questions related to the factors affecting self-reported environmental beliefs and practices, the study evaluated the contribution of school's environmental mission, the respective environmental curricula, and students' environmental knowledge, on students' pro-environmental self-reported attitudes and behaviours. Also, the study identified students' most used sources of information to acquire environmental expertise and raise their environmental awareness.

A six-point Likert scale was adopted in measuring the effect of schools' environmental mission and schools' environmental curricula. This scale type helps to avoid the mid-point answer. The rationale of choosing an even number of response categories is due to the nature of the topic, which requires identifying the factors that may influence students' self-reported attitudes and behaviours. In a sense, an even numbered scale makes or helps respondents to be more thoughtful, but at the same time, respondents could become frustrated.

The last section of the questionnaire intended to evaluate the level of students' environmental knowledge through answering 13 questions related to general environmental issues in Oman. These questions have been determined to be the most suitable questions for Omani students in grades 10, 11 and 12, based on the environmental topics covered in the schools' subjects. Also, these questions relate to students' environment and daily routine.

4.7 Sample Size and Site

For this study, the targeted sample included students, teachers, and heads of schools from four different public (government) schools only. These schools are located in various areas in the capital city of the Sultanate of Oman. The focus on a public school is because, in Oman, the vast majority of students are enrolled in these schools. According to Orcher (2016), the idea behind selecting the sites or individuals for the proposed study is that the sample should best help the researcher understand the problem and research questions. Since this research seeks to investigate the pro-environmental attitudes and behaviours of Omani students, the capital city of Oman is the most suitable site for conducting this study, due to the distinct characteristics that it has possessed during the last century. The government of Oman had implemented some practical pro-environmental actions and policies in the previous decade. The pro-environmental actions were first conducted in the capital city of Muscat. For instance, Oman public

transportation was established in 1975 and rebranded as “Mowasalat” in 2015. The Oman National Transport Company had set up a school bus service primarily in the Muscat Region. Today, it has become a noteworthy network of local transport, connecting all the cities in Oman. One of the main aims of Mowasalat is to encourage citizens to use public transportation. Also, it provides safe and environmentally friendly transportation.

The Oman environmental services company Be’ah, which is responsible for solid waste management in the Sultanate of Oman, was established in 2007. Be’ah strives towards a vision to conserve the environment of a beautiful Oman for future generations. Be’ah’s main objectives are to control environmental damage incurred during traditional waste dumping processes; structure the waste sector and its related services sustainably; develop the industry; and support the economy. Within this context, Be’ah works on moving towards sustainable waste management practices as per the international standards by establishing the required infrastructure, restructuring the municipal waste collection services and improving public awareness of waste management (www.Be’ah.om, 2018).

The second reason for selecting these particular four schools in the capital city is the easy to access to these schools. Also, these schools are located in different areas of the city, which allowed the researcher to cover the maximal regions of the capital city. Therefore, the participants were students from grades 10, 11 and 12, teachers and heads of schools from secondary schools.

For the quantitative phase of the study, which consisted of male and female students aged between 15 and 18 and the number of participants in this group is 212. The rationale behind that is to infer different attitudes and behaviours towards environmental issues.

For the qualitative phase of the study, eight teachers, four heads of schools, and thirteen students were selected to participate in the semi-structured interview. The number of students were total 13 divided as 7 females and 6 males.

Government or public schools have been selected because most Omani schools are public schools (1048 public schools compared to 486 private schools), which are funded by the government (ncsi.gov.om, 2018). Also, the national curricula are taught in all government schools, whereas private schools can choose different curricula. In Oman, the clear majority of students are enrolled in public schools. At total of 540,068 students enrolled in public schools, whereas 101,860 students enrolled in private schools in Oman in the year 2015/2016 (www.atheer.om, 2018). Moreover, the research targeted students in grades 10 to 12 in science, geography and social studies classes, and teachers who teach these subjects, to collect rich data related to the different dimensions of environmental education. This group was chosen because environmental topics are mainly introduced through these three subjects. Also, the secondary level (grades 10–12) is expected to have a better knowledge about the issue that is under investigation (Wong et al., 2018). Given that one of the aims of this study is to identify the factors determining students' attitudes and behaviours towards environmental issues in the Sultanate of Oman, students' knowledge, attitudes and behaviours were the primary focus of the study, obtained through semi-structured interviews and a structured questionnaire.

The qualitative sample was much smaller than the quantitative sample. This helped the researcher obtain an in-depth qualitative exploration and a rigorous quantitative examination of the topic. Also, the objective of data gathering differs for the two approaches, as quantitative data collection aims to generalise from a broader population, while qualitative data collection seeks to develop an in-depth understanding from a small number of people. Some of those students who participated in the questionnaire survey would be identified for interview.

Additionally, teachers of science, geography, and social studies subjects only, and heads who led the targeted schools would be chosen for the semi-structured interviews.

4.8 Sampling Procedure

According to Cohen et al. (2013), sampling entails the process of identifying a group of individuals from a population who will offer a representative picture of the whole. As a result, non-probability sampling was used to determine the individuals to participate in the surveys and interview, respectively. For the quantitative phase of the study, a convenience sample was selected. Those from the identified secondary schools were subjected to convenience sampling. Harding et al. (2018) argued that the method of collecting data involves selecting participants based on their availability. Further, using the technique, the survey questions were distributed among a sample of 212 students, including both males and females, between the ages of 15 and 18.

For the qualitative phase of the study a purposeful sampling method was adopted. This method implies intentionally selecting individuals who understand the central phenomenon under investigation (Palinkas et al., 2015). The idea is to purposefully select informants who will best answer the research questions and who are “information-rich” persons (Punch and Oancea, 2014). Purposive sampling was used to identify the 12 teachers, four heads of schools, and thirteen students who would participate in the interviews. Purposive sampling involves the identification of respondents based on their ability to possess the attributes considered in the inclusion strategy of study (Cohen et al., 2017). Punch and Oancea (2014) argued that the method seeks to intentionally identify the respondents who provide appropriate feedback for the research questions. The sample chosen in purposive sampling is based on the groups sharing the same characteristics. It was used in this research to choose the sample sharing homogenous

characteristics so that variations could be reduced, and findings could be generalised easily. A snowball purposive sampling method was used to identify participants sharing the same characteristics. This includes students in grades 10 to 12 in science, geography and social studies classes, and teachers who teach these subjects.

4.9 Research Instruments

4.9.1 Questionnaires

The research instrument adopted in the first phase of the study was a questionnaire (self-reported environmental knowledge, attitudes and behaviours) for quantitative data, the most widely applied method used to assess the factors that influence a student's environmental attitudes and behaviours (Paul et al., 2016). The questionnaire included a total of 53 items distributed across 30 questions. A survey of 212 students was conducted to collect the views of the respondents regarding attitudes and behaviours towards environmental issues, and also to assess participants' environmental knowledge through applying self-reported assessment and assessed assessment.

The justification for using a questionnaire is because it is an inexpensive and time-efficient way of gathering a large amount of data, and it is easy to conduct (Kroesen et al., 2017). Primarily, a survey entails the process of collecting information structured for statistical analysis. This implies that data is aggregated to draw logical conclusions. One part of the questionnaire was constructed by the researcher through adapting questions from existing questionnaires employed in the study: *"A Preliminary Investigation into the Environmental Awareness of the Omani Public and their Willingness to Protect the Environment"* by Abdul-Wahab (2008).

This existing questionnaire appeared very helpful and relevant to the research questions, matching the aims of this study. The rest of the sections were constructed by the current researcher. For example, the researcher used the same strategy questionnaire as used in the first study and made some slight changes in the self-assessment questionnaire by writing new items. This was undertaken to examine the perspectives of the target participants toward their schools' mission on their environmental attitudes and behaviours, and the sources of methods used to build up their awareness of environmental topics. The researcher added several points to the questionnaire, for instance, an open-ended question asking the participants to add more details, such as examples of sources they had read or watched about the environment; and some items asking students to assess their knowledge about environmental issues.

The first section of the questionnaire concerned the demographic information of the samples regarding characteristics such as age, gender, educational level, school name, and household location (see figure). The second part employed a 13-point frequency scale in which they had to decide on six individual points, ranging from “every day” to “never”, in an attempt to examine the frequency of their pro-environmental attitudes and behaviours in their day-to-day lives (see figure). In addition, the researcher included some open-ended items in this section, such as questions related to the frequency of participation in environmental activities, and providing examples of such activities. The third part consisted of nine items in which they had to decide on a 6-point scale ranging from “strongly disagree” to “strongly agree” intended to examine the target sample's environmental attitudes and behaviours.

The fourth phase in the self-assessment questionnaire included four items with answers ranging from “very poor” to “very good” that investigated their view of the level of their environmental knowledge. Furthermore, the final part of the fourth section was designed to assess the participants' actual environmental knowledge. This section included eight items that

were selected carefully based on the students' level and the information learned through their schools' environmental subjects. These items were adapted from the study "*A Preliminary Investigation into the Environmental Awareness of the Omani Public and their Willingness to Protect the Environment*" by Abdul-Wahab (2008).

Please circle the most appropriate response.

1. Age

15	16	17	18
----	----	----	----

2. Gender

Male	Female
------	--------

3. School Name

--

4. Education level

Grade10	Grade11	Grade12
---------	---------	---------

5. Location of household

Rural setting	Urban setting
---------------	---------------

6. How often do you do the following pro-environmental behaviours in your day-to-day life?

Environmental Behaviours	Everyday	Once a week	Once a month	rarely	Never
A. Recycle things such as newspapers, cans, and glass					
B. Re-use bags or jars					
C. Turn off lights and electrical appliances when not in use or when you leave the room					
D. Try not to drop litter					
E. Bike or walk to work					
F. Use the bus					

G. Carpool with others					
H. Run air conditioner less often in the summer					
I. Buy organic foods on a regular basis					
	Always	Very often	Occasionally	Rarely	Never
J. Purchase lamps, light-bulbs and appliances that are energy efficient					
K. Donate money annually to an environmental group or organization					
L. Buy dolphin friendly tuna					
M. Buy locally-grown foods on a regular basis					

7. How often do you participate in environmental activities?

(Please Tick where applicable)

Never	Rarely	Once a month	Once a week	Everyday

8. How Often you watch TV programs or read materials about the environment?

(Tick where applicable)

Never	Rarely	Once a month	Once a week	Everyday

B. Please give EXAMPLES of what you read or watch about the environment?

--

The following items describe statements about environmental behaviours in your individual lifestyle. Indicate your agreement or disagreement for questions 14 A-E with the following statements by circling your response using this scale:

1	2	3	4	5
Strongly Disagree	Disagree	Neither agree Nor disagree	Agree	Strongly Agree

14.

Environmental Behaviour	1	2	3	4	5
A. When there is a choice, I always choose the product that contributes to the least amount of environmental damage.	1	2	3	4	5
B. I have switched products for environmental reasons.	1	2	3	4	5
C. If I understand the potential damage to the environment that some products can cause, I do not purchase those products.	1	2	3	4	5
D. Whenever possible, I buy products packaged in reusable or recyclable containers.	1	2	3	4	5
E. I have paid more for environmentally friendly products when there is a cheaper alternative.	1	2	3	4	5

15. Which of the following attitudes and behaviours best suit your opinion on environmental issues? (Tick where applicable)

A. Environmental pollution and degradation affect me	1	2	3	4	5
B. The government should introduce harsh measure to curb pollution	1	2	3	4	5
C. I am big champion of recycling and re-use of waste	1	2	3	4	5
D. I would be willing to engage in personal sacrifices to stop environmental pollution and degradation	1	2	3	4	5

16. What are major source of information on environmental education accessible to you?

Information source	Tick where appropriate	Information source	Tick where appropriate
Newspapers		Conversations with friends or neighbours	
Books		Government agencies (STATE OR FEDERAL)	
Journals		Conservation or Environmental Groups	
Social Media		Environmental learning centres, including nature centres, parks, science	
Workshops		Scientific experts	
School		Other	
Family			

17. If you would like to increase your environmental awareness, what method would you use? (Choose 3 only).

Method	Provide Examples
Education curricula at schools	
Radio	
Television	
Magazines	
Conferences and seminars	
Exhibitions	
Competitions	
Education campaigns	

18. I consider myself highly knowledgeable about Environmental issues (Tick the correct Box)

Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

To answer the following questions (19-22), please use a 5-point scale where 1 means very poor and 5 means very good. **Please circle the appropriate number from 1 to 5.**



19. How much would you say you know about Environmental problems?

1	2	3	4	5
---	---	---	---	---

20. How much would you say you know about Air pollution?

1	2	3	4	5
---	---	---	---	---

21. How much would you say you know about Energy issues?

1	2	3	4	5
---	---	---	---	---

22. How much would you say you know about Water quality?

1	2	3	4	5
---	---	---	---	---

Please circle the correct answer for question 23-30. Circle one answer only

23. Global warming defined as "an increase in the Earth's temperature caused by human activities.... Which release...greenhouse gases into the atmosphere." Which of the following is a common greenhouse gas?

1. Sulfur dioxide
2. **Carbon dioxide**
3. Nitrogen or
4. Hydrogen

24. All the activities listed here are contributors of human-caused greenhouse gases in Oman. Which of the following is the LARGEST contributor to greenhouse gas emissions in Oman?

1. Agricultural operations
2. Leakage from refrigeration systems
3. **Burning fossil fuels (COAL, OIL, GASOLINE, DIESEL AND NATURAL GAS), or**
4. Gases released from landfills

25. What is the MOST common reason that an animal species becomes extinct in Oman? Is it because....
1. Pesticides are killing them
 2. **Their habitats are being destroyed by humans**
 3. There is too much hunting, or
 4. There are climate changes that affect them
26. What is one of the MAIN benefits of wetlands? Do they...
1. Help to control global climate change
 2. **Help filter and store water before it enters lakes, streams, rivers or oceans**
 3. Prevent the spread of undesirable plants and animals, or
 4. Provide good sites for landfills
27. Where does MOST of the garbage in Oman go? Would you say...
1. **Landfills**
 2. Waste to energy incinerators
 3. Burn barrels
 4. Recycling centres
 5. Compost facilities
28. Thinking about Oman, which of the following uses the most energy in people's homes? Is it...
1. Lighting rooms
 2. Heating rooms
 3. **Cooling rooms,**
 4. Heating water, or
 5. Refrigerating food
29. In the past ten years, has the fuel efficiency of vehicles in Oman
1. Increased
 2. **Remained the same**
 3. Decreased
 4. Not been tracked
30. Which of the following do you think energy experts say is the fastest and most cost-effective way to address our overall energy needs? Would you say
1. Develop all possible domestic sources of oil and gas
 2. Build more nuclear power plants
 3. Build more hydroelectric power plants, or
 4. **Become more energy efficient?**

Figure 4. 2 Questionnaire Questions

4.9.2 Interviews

A semi-structured interview is the second research method for this study, collecting the qualitative data. According to Yin (2014), interviews are an effective method of collecting rich data through directly interrogating the respondents to gather the required information. An interview schedule was developed and used to collect data from 8 teachers, four heads of schools, and 13 students who participated in the interviews. The semi-structured interview included both open-ended and close-ended questions based on the survey questions. It consisted of three different forms of questions, one for each different group, namely, head of schools, teachers, and students. There were 14 pre-prepared open-ended questions for students and the interviews were expected to take approximately 30 minutes (see Appendix F).

The data collected from this instrument elaborated on the research questions, for instance, to determine participants' awareness about environmental education and their participation in environmental activities in more detail. During the interviews, participants' perceptions were considered on the role of the school mission and environmental curriculum on their environmental attitudes and behaviours. This allowed the findings to augment further the results determined in the survey, hence providing a better explanation of the subject under investigation.

Silverman (2016) suggested using qualitative data to search for the most productive possible data. Ultimately, using open-ended questions in the interview enabled the researcher to obtain a more in-depth view of the phenomenon, give interviewees the chance to elaborate and provide investigators with the opportunity to demonstrate an accurate picture of the event under scrutiny (ibid). The interviews were audio-recorded, and the recorded data were transcribed and analysed (a CD of the audio-recorded interviews was attached with the hard copy of the dissertation).

4.10 Data Analysis Procedures

The process of data analysis included both descriptive statistical analysis and qualitative analysis, which followed the thematic analysis method. Based on the data collected from the survey, SPSS statistical analysis program version 24 was used to analyse the quantitative data. This included coding the choices offered in the surveys and inputting them into the software to generate statistical information such as tables, graphs, charts, and descriptive analysis, among other information. In the context of qualitative data, thematic analysis, as propounded by Braun and Clarke (2018), was used to code the responses from the participants systematically. Primarily, qualitative data collected in interviews may be captured through recording and note-taking. To analyse the data, the researcher began by listening to the meetings, transforming the recordings into a textual form, and reading the transcriptions (see Appendix H).

Furthermore, when the researcher of this study came across such transcriptions, they were highlighted through using Nvivo Program. Labelling these highlighted extracts meant they could be easily identified, and subsequently summarised looking out for the answers to the research questions. This led the researcher to themes and highlighting any new texts that were not linked to the focus area emphasised new results. To analyse this data, as Braun and Clarke (2018) asserted, thematic analysis, which includes a six-step process, could be used to identify the emerging themes in the responses logically.

Thematic analysis is a method for identifying, analysing, and reporting patterns or themes within data. It minimally organises and describes the data set in rich detail. However, frequently, it goes further than this and interprets various aspects of the research topic (Joffe, 2012). While it is a widely used approach in analysing qualitative research, it is a poorly acknowledged method when compared to more conventional methods such as grounded theory.

It is argued, however, that what distinguishes thematic analysis from approaches such as grounded theory or discourse analysis is the fact that it “does not rely on pre-existing theoretical frameworks and that it is, therefore, a more accessible approach” (Braun and Clarke, 2018), with the ability to be used with a wide variety of frameworks.

Thematic analysis lends itself to providing a rich thematic description of the whole data set, and it is, for this reason, a useful approach when exploring new or under-researched areas and is particularly relevant to social studies. A well-conducted analysis involves some level of interpretation of the data. Thematic analysis is used here as it provides clear links between themes and the aims of the study to guide the development of analytical claims. However, despite the disparity in the method of data analysis, the results established in the quantitative and qualitative analysis complement each other. The findings of the qualitative analysis allow to a broader degree the development of a better explanation of the area under investigation, while enhancing the quantitative results.

4.11 Reliability and Validity

Reliability and validity are very important for decreasing errors that might arise from measurement problems in the research study. Validity refers to the accuracy and precision of a measurement procedure (Creswell, 2014). According to Creswell (2014), there are three traditional forms of validity relating to quantity findings: first is the content validity “do the items measure the content they were intended to measure?” The second is the criterion-related validity. Within this type of validity there are two primary forms: predictive and concurrent validity “do results triangulate with other data results that were obtained at a different time?” and “are results highly correlated using two different instruments?” The third form is the construct validity “do items measure theoretical constructs or concepts?” In more recent studies,

construct validity has become the overriding objective in validity, and it has focused on whether the scores serve a useful purpose and have positive consequences when they are used in practice (Yin, 2014).

The validity of the survey instrument was obtained through the pilot testing of the instrument. The motivation, knowledge, abilities and skills of the respondents of the interview were assessed to judge their performance. This increased the reliability of the data collected from the interviews.

The pilot testing would show if the same results were obtained with the repeated administration of the same survey to similar study participants. Moreover, the insights from the pilot study would offer suggestions to improve the questionnaire and the whole study process. Regarding the validity, researchers always wonder about the accuracy of the method employed to collect the data. Thus, the validity of the questionnaire could be achieved through the relationship between the items used and the purpose of the study; therefore, a pilot study was conducted to ensure reliability in the findings as an alternative to the pre- and post-tests (Bryman and Cramer, 2004).

Internal reliability was accomplished through the use of triangulation mixed methods to compare the responses of the sample through questionnaires and semi-structured interviews (Johnson et al., 2007; Walliman, 2017). Also, the researcher was able to use more than one instrument to collect the data to improve the validity and reliability of the research (Cohen et al., 2011). Also, validity in research is the procedure undertaken in a study for checking the credibility and accuracy of the findings (Cronk, 2016). Content validity of the survey will be established as it will show the extent to which the survey items and the scores from these questions are representative of the leading research question. Before conducting the data collection, the researcher applied for approval from the MOE to administer the data collection

instruments (approval no. 119, see the appendix A). Therefore, the wording of the survey items has been checked by some experts from the MOE. Also, they assessed the survey in terms of its relevance to the aims of the proposed study, as well as the design of the study.

Reliability test is that measures if an instrument is stable and consistent that indicated to which construct or a dimension is with no bias (i.e., free from random error), the measure is utterly reliable (Malec, 2018). According to the previous reference, reliability is the consistency of the respondent or the standards obtained through a person in a pilot test for data collection instruments administrated. According to Bonett and Wright (2015), Cronbach's alpha is generally used to measure the elements' loadings and validity of the instrument utilised as a part of the study. The Cronbach's alpha value is the average of all possible split-half co-efficients resulting from different ways of splitting the scale items and used to measure reliability. Acceptable reliability should be 0.70 or higher, and a value of 0.6 or less shows unsatisfactory reliability (Taber, 2018). A reliability co-efficient shows how well the variables in a set are entirely related to each other, therefore, if the value of Cronbach's alpha is well above 0.7, this is viewed as acceptable according to Bonett and Wright (2015).

4.12 Quality Assurance

Quality assurance has also been considered during research design. Quality assurance for this study focused on three main elements. The first one is the design assurance. Design assurance was performed using two methods. The first method was the triangulation approach in which more than one method of data collection was used: converging interviews' and questionnaires' information. The second method in design assurance was through the implementation of pilot testing (Hardy and Bryman, 2009). The piloting is an essential stage in conducting research instruments. This highlights any potential problems in the questionnaire

and ensures that the participants understand the questions correctly. Also, it helps the researcher to measure and monitor the time needed to complete the questionnaire, to ensure that it does not take too long. It can be seen that the quality assurance could be imparted through the secondary methodology.

Random sub-samples would be then responsible for the targeted sample through the appropriate response assurance; hence it was possible to provide the necessary transcription of interviews and questionnaires that were completed by the designated person (Creswell, 2014). The third type of quality assurance used was the “result assurance”. This will be such that the participants that are present within this entity are confirming to have the designated “researcher’s participants” that will be able to use the data for the purpose of the study that is being conducted. Additionally, trustworthiness and rigour were further established by keeping an audit trail and ensuring transparency of actions and reasoning throughout the research. Reflectivity with regards to any potential bias, which may affect the interpretation of findings, was also acknowledged transparently, as were any possible contradictory results or discrepancies regarding themes and outcomes (Hollweck, 2015; Yin, 2014). The full description was also used in presenting a rich and detailed account of the research to provide the opportunity for transferability of findings by individuals (Leal Filho, 2015). Moreover, it was essential that the issue of reliability was addressed by ensuring thorough and detailed documentation of every stage throughout the research process. Furthermore, a person outside the project was to be asked to conduct a comprehensive review of the study and report back (Hollweck, 2015; Yin, 2014).

4.13 Ethical Consideration

Ethics plays a significant role as a guideline to quality research outcomes (Israel and Hay, 2006). Because research involves data from people and about people, research inevitably

carries ethical issues. Thus, the researcher of this study had to anticipate them effectively and addressed them in the research plan. Therefore, to conduct the current research, an ethical approval, reference number 1003, was issued online by the Ethics and Governance Department at Northumbria University.

Ethical considerations have been considered to each stage of the current study, beginning with the researcher's choice of topic, which raised such questions as to why this research is worthwhile and who benefits from this research? Israel (2014) stated that researchers should show concern about their research participants through developing their trust and providing them with clear information about the research topics, the aims of the study and its significance. As a result, the study considers ethical issues relating to anonymity, confidentiality, informed consent, and voluntary participants and commitment by the researcher to report objectively.

To maintain anonymity, the researcher used codes to represent the respondents of the study. Moreover, the usage and storage of the provided data was discussed with the participants to provide them the security and confidence. A letter of agreement was attached to each questionnaire, which described the objective of this study and how participants' responses would be used and handled. Each participant was asked to sign this letter to confirm that they understood the consequences of participating in research, and they agreed with the terms and conditions of this research. As a result, all permissions were sought from all heads of schools, teachers, and students who were affiliated with the respective schools. The aim of the study was explicitly communicated through the consent form and the freedom of the participants to be involved willingly was confirmed. Moreover, confidentiality would be maintained throughout the study to ensure that only relevant or necessary information was disclosed to the authorised recipients. Additionally, in reporting, the researcher committed to maintaining a high degree of objectivity and avoiding biased reporting.

At the beginning of the interview, the researcher discussed the study briefly and provided the participant the opportunity to ask any questions. It was assured that all the participants of the study were doing it by choice and that they still had the option to withdraw at any time. For all interviews, a discussion took place as to whether they were happy with the interview being audio-recorded. If they agreed for the recording to take place, then they were also informed that if at any time throughout the interview they would like the recording to be stopped, they could just inform the researcher. A small recorder was placed between the researcher and the participant while conducting face-to-face interviews. However, recording equipment was not turned on until consent to record was given. Prior to recording, participants were asked if they consented to anonymous direct quotations being used in the reporting of the data. Participants were informed that if they wished to discuss any aspects of the study with them that they were free to do so.

All who agreed to take part signed the form of consent (see Appendix D), which they were to keep for their information. The researcher also ensured that a signed consent form from four schools was signed and returned through email before the interviews. At the time of consent, participants were allocated a study identification number. Only one list matching these identification codes to the participants' details was kept in a setting that is password protected. The database was secured such that it could be accessed by the database of the researcher's computer that was housed in a locked work-based office. Copies of consent forms were kept in a locked filing cabinet in the researcher's office, separate from any interview data.

4.14 Chapter Summary

A comprehensive methodology is considered as the blueprint of the whole research process, and the reliability of the research is dependent upon it. The methodology chapter

provided a step-by-step process for an investigation so that aims and objectives of the study can be fulfilled successfully and research can be completed using preferred research instruments, methods, approaches, and design. This chapter discussed the philosophy underpinning the mixed methods research approach and described the theoretical framework of this research. Pilot studies were also used in this research for designing research instruments, which were completed in every aspect before starting the actual results. Questionnaires and interviews were used for collecting information from the respondents so that data could be processed further in the analysis phase. Through research instruments, the answers to the research questions would be found. Reliability and validity of research instruments have been ensured to the best of the researcher's knowledge and ability. Moreover, this chapter provided a brief indication of quality assurance for the current study and concluded by discussing the ethical considerations that were necessary to be fulfilled before starting the research project.

CHAPTER 5: DATA ANALYSIS AND RESULTS – SURVEY DATA

5.1 Chapter Overview

This chapter depicts the analysis of the information collected for conducting the survey and it outlines the identified patterns in the process of this study. The results generated from this section form the basis for the following chapters.

5.2 Survey Data Analysis

The data set used here is from the survey of Omani students' environmental attitudes, knowledge and behaviours, conducted in Oman in October 11 to November 20, 2017. In total, the number of participating students for this study is 212. These participating students belong to different schools, genders and grades, therefore, they depict depth and diversity in the conducted study.

5.2.1 General Characteristics of the Participants

The first section of the survey aimed to gather demographic data about the participants: age (ordinal, 4 categories), gender (nominal, 2 categories), school name (nominal, 4 categories), education level (ordinal, 3 categories) and location of household (nominal, 2 categories) (see Appendix E for the questionnaire form). Of all the participants in this study, 38.2% of the participants were aged 15 and 16, 50.9% were aged 17 and the remaining 10.8% were aged 18.

5.2.1.1 Age

100 percent of the respondents were between the ages of 15 and 18. This indicates the average age of students in the secondary school levels 10-12 in Oman. The table 5.1 below shows the distribution of age variable. 81 students were age of 15 and 81 students were age 16. 43 students were age of 17 and 8 students were age 18.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15	81	38.2	38.2	38.2
	16	82	38.7	38.7	76.9
	17	43	20.3	20.3	97.2
	18	6	2.8	2.8	100.0
	Total	212	100.0	100.0	

Table 5.1: Frequency of participants' age .

5.2.1.2 Education Level

		Frequency	Percentage	Valid Percent	Cumulative Percent
Valid	Grade 10	81	38.2	38.2	38.2
	Grade 11	108	50.9	50.9	89.2
	Grade 12	23	10.8	10.8	100.0
	Total	212	100.0	100.0	

Table 5.2: Number of participants in accordance with their educational level.

Among the respondents, the majority of the students belonged to grades 10 and 11, and rest of the respondents were from grade 12. It is clear that the number of students from grade 12 are fewer than those belong to grades 10 and 11. This is due to the availability of students in grades 10 and 11, and their comfort with participating in the survey, whereas students in their final year were very busy with their studies and it was difficult to convince them to participate.

5.2.1.3 Gender

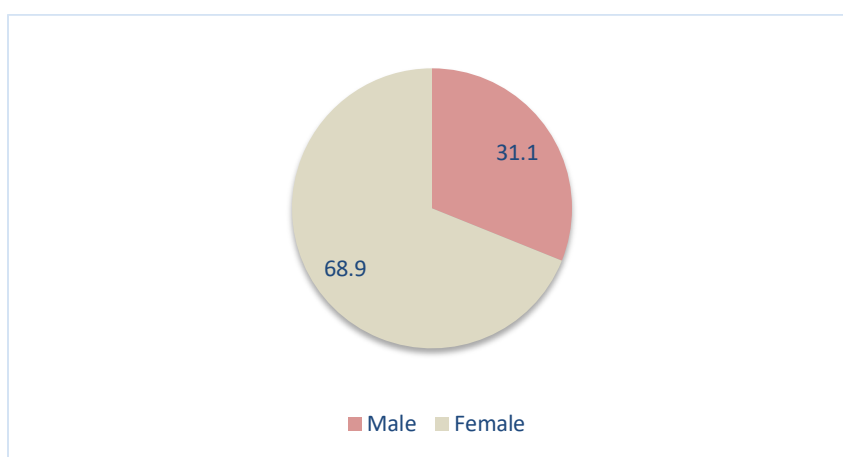


Figure 5. 1: *The percentages of participants according to their gender*

Most of the respondents in the study were female. Due to the overall method that was used for sampling of this study, it was observed that “68.9 %” of the participants included were female. Although the targeted schools were equally divided between male and female (i.e. two schools for each gender), the number of female students who were willing to participate was higher. The main reason for this overwhelming response from the female students was that the research was being conducted by a female researcher. In addition, the researcher had more access to female schools, since she is a former teacher. This allowed her to easily approach her colleagues and fellow teachers to distribute the questionnaire in female schools, based on their

suitability to the sampling criteria. The easy access to the female schools contrasted with that of the male schools in terms of the different cultural norms between the genders that the researcher of this study faced.

5.2.1.4 Location of Home

Regarding the variable “location of the household”, 100% of respondents were in the urban setting. This is due to the inclusion criteria of this research in terms of the school’s location, which required it to be in the capital city, Muscat. The government of Oman had implemented some practical pro-environmental actions and policies in the previous decade. The pro-environmental actions were first conducted in the capital city of Muscat. Also, the government policy for choosing the appropriate school is in terms of easy access for transportation and the shortest distance from the students’ house.

5.3 Descriptive Statistics

Descriptive statistics are statistical measures that depict the fundamental features of the collected data, such as the summary statistics, central value, maximum and minimum points. In research studies with large sample sizes, descriptive statistics are helpful for summarising the data for recognising the positive and negative responses. This research uses the mean value as a measure of central tendency (see Appendix I).

The results that were obtained from the following analysis indicate that the majority of the participants believed that schools are doing enough in promoting environmental sustainability. The results obtained implied that schools were doing what it was required to empower students regarding environmental issues. Hence the findings were then used to help empower the students regarding the education related to the environment. Of the 212

participants, 150 agreed that their school was doing enough to empower their environmental education. These individuals believed that their school is doing enough to empower them towards the ideology related to environmental issues. However, a total of 62 participants did not agree that their school was doing enough to empower students on environmental education, according to the table 5.3, but that is not what this statement suggests.

			Your school is doing enough to empower students on environmental education?						Total
			Strongly Disagree	Disagree	Disagree Somewhat	Agree Somewhat	Agree	Strongly Agree	
Education level	grade 10	Count	4	6	7	21	24	19	81
		% within Education level	4.9%	7.4%	8.6%	25.9%	29.6%	23.5%	100.0%
	grade 11	Count	14	11	14	29	25	15	108
		% within Education level	13.0%	10.2%	13.0%	26.9%	23.1%	13.9%	100.0%
	grade 12	Count	1	2	3	6	7	4	23
		% within Education level	4.3%	8.7%	13.0%	26.1%	30.4%	17.4%	100.0%
Total		Count	19	19	24	56	56	38	212
		% within Education level	9.0%	9.0%	11.3%	26.4%	26.4%	17.9%	100.0%

Table 5.3: Education level * Your school is doing enough to empower students on environmental education?

According to the results (mean=4.58) on a scale of 6, 175 students consider the school's missions sufficiently structured to address environmental sustainability. A larger number of participants believed that their own schooling system was sufficient to provide the environmental knowledge and education, and its importance, in the mission and vision statement. In other words, having a relatively high mean score for this question could be attributed to the annual Schools' Health and Environmental competition, which all schools in

Oman are required to participate in. The majority of schools take this competition seriously and consequently give it a lot of attention in term of publicity, school activities, student involvement and even allocating a certain budget to prepare for the competition. Students probably linked this competition with the school mission and with its environmental plans and activities.

In the assessment of the school curriculum and its role in promoting environmental education, the analysis suggests a sufficient contribution. In general, the results point out that 150 students believed that the curriculum in schools within Oman are well or sufficiently designed to support environment knowledge. The mean score presented in Appendix I illustrates the general tendency of students' views regarding the extent to which environmental issues are covered in schools' curriculum. However, the result does not claim that this is the only view the students had about the curriculum, but the most commonly held one. The extent of the results can be seen with the fact that the mean is a high number, which is an indication that the majority of the students were under the impression that their school was able to provide sufficient awareness and information regarding the environment in their curriculum.

With regard to prioritising environmental education in schools, the analysis illustrated a proficient level of consideration on environmental issues (mean=4.63). 171 students agreed that environmental education is important in their schools. This is largely related to the respective curriculum and other school related factors. It was observed that most of the students relied heavily on information from the mass media and schools. Hence, this presence of prioritisation of environmental conservation is projected to have a very major impact on the behaviours and attitudes of the students on issues related to the environment.

On the question of environmental pollution and degradation, the majority of the responses (175 students) showed that the individuals believed that it has a very important implication for them. The results (mean=4.28, Standard Deviation SD=1.03) suggest a

recognition that an increase in pollution and environmental degradation in society will affect humans. This forms the impetus for behavioural intentions and attitudes of the population based on the perceived consequences. As a result, it was also observed that the results obtained from the majority of the individuals (139 students) exhibited a positive approach towards championing recycling and re-use of waste. This pro-environmental behaviour was observed to represent a significant level of commitment towards positively changing behavioural intention (mean=4.00). Similarly, they were willing to engage in personal sacrifices to stop environmental pollution and degradation. Most of the respondents (128 students) indicated a positive outlook toward engaging in activities that can be defined as environmentally friendly. This can be further elaborated on by the willingness to shift attitudes and behaviours towards a more supportive and environmentally friendly initiative such as conservation or recycling. In assessing the role of government in promoting positive attitudes and behavioural targets on environmental issues, it was then also observed that most of the respondents (mean=4.32) recommended the implementation of harsh measures by the government. This was considered an appropriate effort towards creating awareness and compliance through policy regulation.

5.4 Analysis of Assessed Knowledge, Self-reported Knowledge, attitudes and behaviours Questions

5.4.1 Analysis of Knowledge Questions

5.4.1.1 Analysis of Assessed Knowledge Questions

In order to significantly understand the attitudes of the students towards environmental protection, it is essential to test how aware they are of the environmental problems and underlying causes. Therefore, this research utilised numerous assessed knowledge questions to assess the knowledge of research participants regarding environmental problems. It was seen

that 68.9% of the participants were female and the remaining 31.1% were male, and all belonged to urban households of Muscat. All the participants had a sound knowledge of environmental education, however, as most of the female participants contributed to the study because of their personal relationships with the researcher, it can be stated that males are more aware of the concept of environmental education and degradation of the environment (see Appendix L) . This difference is more a reflection of social engagement . Participants have a deep understanding of the harmful effects of greenhouse gases and the threat that the activities of humans pose to the existence of animal species. It is clear from the table 5.4 that 116 students answers correctly to the question what is the common greenhouse gas.

Moreover, the participants had a sound knowledge of the subject of waste management. Their environmental education has provided them with good knowledge about waste management methods and the waste management process in Oman. Most of the respondents knew that the most common method of waste disposal in Oman is landfill. They further reported that after receiving environmental education their attitudes towards the environment had changed as it had broadened their vision and exposure to environmental problems and their aftermath. Table 5.4 illustrates that 67.8% of the research participants knew that carbon dioxide is a common greenhouse gas. This high percentage indicates that sample participants knew about the depth of the environmental problems. In addition to other assessed knowledge questions the mean value of participants' answers also confirms the knowledge of the sample in relation to environmental problems as a high means value indicates that participants have an in-depth knowledge of environmental problems and threats concerning environmental sustainability (see Appendix I). Moreover, they indicate a positive outlook towards engaging in activities that can be defined as environmentally friendly.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sulfur dioxide (Correct answer)	40	18.9	19.0	19.0
	Carbon dioxide	143	67.5	67.8	86.7
	Nitrogen	28	13.2	13.3	100.0
	Total	211	99.5	100.0	
Missing	111 code	1	0.5		
Total		212	100.0		

Table 5.4: Global warming defined as “an increase in the Earth’s temperature caused by human activities.... Which release...greenhouse gases into the atmosphere.” Which of the following is a common greenhouse gas?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agricultural operations	42	19.8	19.9	19.9
	Leakage from refrigeration systems	52	24.5	24.6	44.5
	Burning fossil fuels (coal, oil, gasoline, diesel and natural gas) (Correct answer)	116	54.7	55.0	99.5
	Gases released from landfills	1	0.5	0.5	100.0
	Total	211	99.5	100.0	
Missing	111 code	1	0.5		
Total		212	100.0		

Table 5.5: All the activities listed here are contributors of human-caused greenhouse gases in Oman. Which of the following is the LARGEST contributor to greenhouse gas emissions in Oman?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pesticides are killing them	102	48.1	48.6	48.6
	Their habitats are being destroyed by humans (Correct answer)	70	33.0	33.3	81.9
	There is too much hunting	38	17.9	18.1	100.0
	Total	210	99.1	100.0	
Missing	111 code	2	0.9		
Total		212	100.0		

Table 5.6: What is the MOST common reason that an animal species becomes extinct in Oman? Is it because

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Help to control global climate change	95	44.8	45.7	45.7
	Help filter and store water before it enters lakes, streams, rivers or oceans (Correct answer)	74	34.9	35.6	81.3
	Prevent the spread of undesirable plants and animals	39	18.4	18.8	100.0
	Total	208	98.1	100.0	
Missing	111 code	4	1.9		
Total		212	100.0		

Table 5.7: What is one of the MAIN benefits of wetlands? Do they...

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lighting rooms	17	8.0	8.1	8.1
	Heating rooms	68	32.1	32.5	40.7
	Cooling rooms (Correct answer)	120	56.6	57.4	98.1
	Heating water	4	1.9	1.9	100.0
	Total	209	98.6	100.0	
Missing	111 code	3	1.4		
Total		212	100.0		

Table 5.8: Thinking about Oman, which of the following uses the most energy in people's homes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Develop all possible domestic sources of oil and gas	18	8.5	8.6	8.6
	Build more nuclear power plants	75	35.4	35.9	44.5
	Build more hydroelectric power plants	4	1.9	1.9	46.4
	Become more energy efficient? (Correct answer)	112	52.8	53.6	100.0
	Total	209	98.6	100.0	
Missing	111 code	3	1.4		
Total		212	100.0		

Table 5. 9: Which of the following do you think energy experts say is the fastest and most cost-effective way to address our overall energy needs? Would you say

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Increased	113	53.3	54.1	54.1
	Remained the same (Correct answer)	46	21.7	22.0	76.1
	Decreased	28	13.2	13.4	89.5
	Not been tracked	22	10.4	10.5	100.0
	Total	209	98.6	100.0	
Missing	111 code	3	1.4		
Total		212	100.0		

Table 5. 10: In the past ten years, has the fuel efficiency of vehicles in Oman

5.4.1.2 Analysis of Self-reported Knowledge Questions

There has been an increase in the problems related to the environment. It can be seen that male students were more aware of environmental problems compared to female students see table 5.11. The disparity in environmental awareness between the two genders is largely linked to the level of access to the social engagement. Women have fewer opportunities to access social incentives relative to men due to culture and their social status. Moreover, the results shows that male students were more aware about water , air pollution and energy issues than female students (see appendix L).

		How much would you say you know about Environmental problems?					Total
		very poor	poor	fair	good	very good	
Gender	male	9.4%	4.7%	26.6%	34.4%	25.0%	100.0%
	female	3.5%	13.3%	39.2%	36.4%	7.7%	100.0%
Total		5.3%	10.6%	35.3%	35.7%	13.0%	100.0%

Table 5.11: Cross-tabulation for Gender * How much would you say you know about environmental problems?

5.4.2 Analysis of self-reported Attitudes

There are 5 questions in this data set that address issues related to pro-environmental attitudes (ordinal, 5 categories). Appendix K shows the frequencies of choosing product that contributes to the least of environmental damage. 44 percent of the participant strongly agree to choose product that contribute to the least of environmental damage. Whereas, 3.8 percent strongly disagree. Moreover, the result shows that most of the participant 43.2 percent are neutral in switching products for environmental reasons (see appendix K). 24 percent of the participants agree to switch products for environmental reasons. 34.9 of the participants are neutral about buying products packaged in reusable or recyclable containers, whereas 25 percent strongly agree (see appendix K). It is clear from the graph that the most participants are neutral to this

statement. However, it shows that participants are concerned about the cheaper price of environmentally friendly product. 24.2 percent agree to pay more when there is a cheaper alternative product.

Figure 5.2 and Table 5.12 represent the responses, split by grade, to “When there is a choice, I always choose the product that contributes to the least amount of environmental damage.”

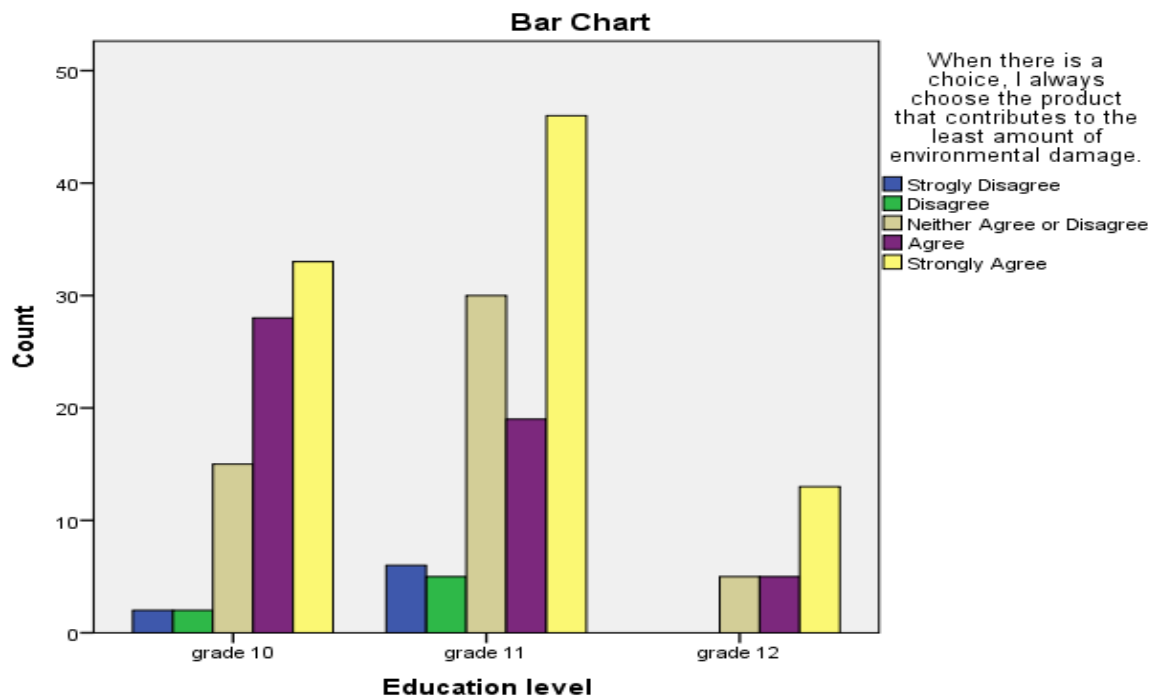


Figure 5. 2: Respondents’ educational level * When there is a choice, I always choose the product that contributes to the least amount of environmental damage. Cross-tabulation

			When there is a choice, I always choose the product that contributes to the least amount of environmental damage.					Total
			Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	
Education grade level	10	Count % within Education level	2 2.5%	2 2.5%	15 18.8%	28 35.0%	33 41.3%	80 100.0%
	11	Count % within Education level	6 5.7%	5 4.7%	30 28.3%	19 17.9%	46 43.4%	106 100.0%
	12	Count % within Education level	0 0.0%	0 0.0%	5 21.7%	5 21.7%	13 56.5%	23 100.0%
Total		Count % within Education level	8 3.8%	7 3.3%	50 23.9%	52 24.9%	92 44.0%	209 100.0%

Table 5.12: Education level * When there is a choice, I always choose the product that contributes to the least amount of environmental damage.

The findings indicate a high level of positive attitudes in the choices made by respondents based on the perceived damage to the environment. At least 144 respondents were of the view that their choices had impacts on the environment. As a result, the behavioural intention of respondents is largely affiliated with the projected negative consequences on the environment. This can be further elaborated on by the fact that the respondents believed that changes could be induced on a personal level and, therefore, the majority of them were under the impression that these changes were sufficient to have a positive impact on the environment. The majority of the participants indicated that they would opt for environmentally friendly products.

Table 5.13 represents the responses, split by grade, to “I have paid more for environmentally friendly products when there is a cheaper alternative.”

			I have paid more for environmentally friendly products when there is a cheaper alternative.					Total
			Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	
Education level	grade 10	Count % within Education level	7 8.8%	4 5.0%	27 33.8%	22 27.5%	20 25.0%	80 100.0%
	grade 11	Count % within Education level	10 9.3%	13 12.0%	54 50.0%	17 15.7%	14 13.0%	108 100.0%
	grade 12	Count % within Education level	1 4.3%	1 4.3%	7 30.4%	12 52.2%	2 8.7%	23 100.0%
Total		Count % within Education level	18 8.5%	18 8.5%	88 41.7%	51 24.2%	36 17.1%	211 100.0%

Table 5.13: Education level * I have paid more for environmentally friendly products when there is a cheaper alternative. Cross-tabulation

Similarly, the respondents exhibited positive attitudes towards pro-environmental behaviours, which were structured to facilitate sustainable environment management. This was observed among the large section of respondents that replied in the affirmative and agreed to buy products that are environmentally friendly even at a higher price. This was equally the case among the respondents with regards to engaging in recycling, re-use, and caution in choosing packaging for products.

5.4.3 Analysis of Self-reported Behaviours

There are 19 questions in this data set that address issues related to pro-environmental behaviours (ordinal, 5 categories). Appendix K describes the frequencies of each environmental behaviours among the whole participants. 3.8 percent of the participants never do recycling. Among those who do recycling, the most common situation is rarely do recycling 60 percent of

the participants rarely do recycling such as newspapers, cans and glasses. This is due to the lack of availability of recycling bins at the schools and areas where the participants stay.

In regards to the frequency table of the variable re-use behaviours, among those who re-use bags or jars, we see that 35.5 percent of the participant re-use bags or jars every day. And 31.4 percent of participants rarely re-use bags or jars. Comparing to the same pro-environmental behaviour in different countries such as Ireland the percentage of people who do reuse bags is high. This is due to the economic instruments scheme; the instrument is known by different names in different countries such as the variable charging, unit-based pricing, pay-as-you-throw scheme, pay-per-bag (Husaini et al.,2007). The results in Husain et al. (2007) showed that the Irish plastic bag schemes established under the variable charging system have made significant reduction and diversion, respectively. However, such policy is not applied in the Sultanate of Oman.

The third environmental behaviour variable was ‘turn off lights when leaving the room’. 0.9 percent of those who not turn off lights when leaving the room. Among those who turn off lights when leaving the room, 83 percent of valid participants turn off lights every day when leaving the room. This behaviour is affected by various factors such as parents and electricity fees. It seems that parents tried to teach their kids to wisely use the electricity. As a result, this will reduce the amount of the electricity consumed which reduce the amount of money paid to the electricity suppliers. See Appendix K for the distribution of participants’ answers. In addition, it is clear from the table that the most common situation that 82.9 % of students everyday tend to not drop litter.

In terms the frequencies of the fifth environmental behaviour biking or walking to school. 11 percent of participants never bike or walk to school (see Appendix K). This could be because the school is a far distance to their house location. Among those who walk to schools every day,

26.2% of valid participants. This indicates that those students located very near to the schools, in sense of considering the climate challenges of Muscat city. The climate of Muscat city is generally hot all around the year, which make it very difficult to walk or bike. Among those who walk to schools but rarely the percentage is 36.2%. This depends on the time where the temperature goes down in winter season.

The most common situation for the environmental behaviour 'using bus; is that participants everyday use the bus for commuting to the schools. This is very widespread in all public schools in Oman, where the government provide the schools with special buses only for students with some safety consideration inside the buses for student security and safety.

The percentage of participants who everyday carpool with others is 42%. This is a common situation in Oman. This is because the common number of family's members range normally between 3-11 person. Moreover, 36% of the valid number of the participants rarely purchase light-bulbs that are energy efficient. Whereas 16 % of the valid participants always purchase lamps that are energy efficient (see Appendix K). 45.8 percent of the participants rarely run air conditioning less often in the summer. This is due to the elevated temperature in summer in Oman especially in Muscat. 35.1 percent occasionally donate money to an environmental group or organization. 37.4 percent the common situation that rarely buy organic food. This is because the organic food is very expensive where students could not afford it. 44.2 percent of the valid number of participants rarely buy dolphin friendly tuna. 28 percent always buy locally- grown food. 48.8 percent of participants do not participate in environmental protection activates. Among those who do participates in environmental activities, 18.5 percent.

5.6 Main Sources of Environmental Information

The findings of the analysis further revealed that the main sources of information on environmental issues were social media, books, family and school. The students have an ideal opportunity to access internet services (12% have access to social media) and socialisation through interpersonal interactions within schools. However, environmental groups, journals, workshops and newspapers were observed to contribute significantly in disseminating the information.

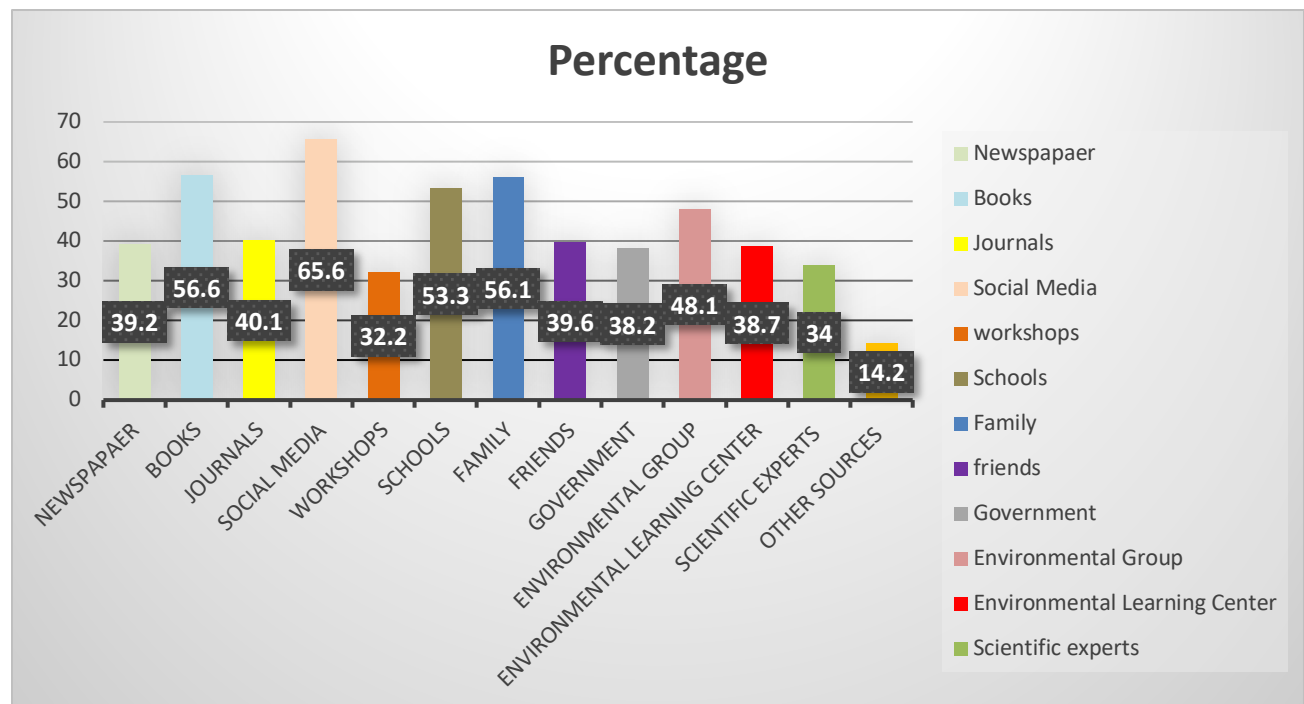


Figure 5. 3: The main sources of information on environmental issues.

Figure 5.3 above shows that 65.6% of students rely on social media as one of the sources of information about the environment. This clearly indicates that the recent generation is influenced by social media platforms. Thus, schools need to exploit this aspect by utilising different social

media platforms to promote pro-environmental attitudes among the students. The next major sources of environmental information are books and family. As a result, it seems family is a key source for their children in acquiring environmental information as family members are looked to as role models. Thus, the family needs to encourage their children in pro-environmental behaviours in their daily activities.

5.7 Factor Analysis

5.7.1 Introduction to Factor Analysis

In this section, factor analysis will be demonstrated. Before getting into the factor analysis of the data collected in this study, the major applications for this kind of analysis will be explained, including why and when factor analysis is used.

Factor analysis is used to compare groups of data to look for differences, correlations or regression, or to make a prediction. It needs the incorporation of the huge amount of data that can be reduced, based on the ability to summarise, or use data that has fewer variables within itself. This can be easily achieved when the connection between the set of variables is very strong. This is going to be demonstrated in more detail in the next section.

Generally, it is very difficult to reduce large data sets manually. Normally, correlations and a correlations matrix can be used to reduce and group small data sets manually, but when there is a huge number of variables, factor analysis is one of the best ways to do this using computer applications.

The analysis of these factors can be amalgamated into many different scenarios. Many researchers use this technique, especially when they are trying to develop and evaluate tests or scales that measure a particular construct or a particular knowledge area. This typically works as the researcher, who is developing a scale with a large number items in the initial stages, uses

factor analysis to smooth and decrease these items into sub-divisions, also called subscales, that measure the theory together but also might implement different aspects of the whole construction ideology. Therefore, it can be seen that the concept of factor analysis can be used to reduce the huge number of related variables to a number that is more manageable in measuring the constructs, but at the same time the researcher still measures the particular aspects under study.

There are two main approaches that are incorporated within the study. One of the approaches is “exploratory”, while the other one is “confirmatory”. The usage of “exploratory factor analysis” was incorporated within the initial stages of the research, where the main aim was gather all the information. This can be used to develop a certain relationship between the different variables. “Confirmatory factor analysis” tries to confirm or test specific hypotheses or theories that were developed concerning the underlying a set of variables. Confirmatory factor analysis is very complex and sophisticated, but it helps to confirm theories and helps to get a better understanding of what a scale or test might be measuring (Thompson, 2004).

The term “factor analysis” is a very general term, and it can be used for the amalgamation of various techniques. Two of the relatable techniques that fall under this concept are: 1) principal components analysis (PCA); and 2) standard factor analysis (SFA).

These techniques have a lot of similarities, but they can also be very different, and they are often used interchangeably. Both techniques try to initiate different individual linear combinations of the basic variables so that it can then explore the many different correlations that are present. However, these two techniques differ from each other in a variety of ways. For example, in PCA the important variables that are analysed are transformed into entities that have a linear correlation that is a very strong factor for the effective transformation of the data into sets of smaller variables. Also, it looks at the variance in all these variables. On the other hand,

the parameters in SFA, are estimated using a mathematical model so the only variance that is analysed is the shared variance instead of the total variance.

Which of these two techniques is to be used in research depends on the objective of the research. If someone is interested in developing a theory or looking for a theoretical solution that is uncontaminated by unique variance, then SFA is probably the best choice. In contrast, if the researcher is interested in more practical applications, and he or she wants an empirical kind of a real-world summary of the data set, then PCA is probably the better choice. In this research, PCA was used because it is one of the most commonly used techniques in the field of education. Also, since this is a more empirical kind of project to evaluate students' self-reported environmental attitudes and behaviours, PCA is the more appropriate technique.

It is important to clarify some of the terminology used in factor analysis. According to Thompson (2004), the term “factor analysis” is used interchangeably to describe both SFA and PCA, but they are very different. For instance, the outcome in PCA is a set of components that go into this measurement technique. They are referred to as components, so care must be taken to use the proper terminology. If the term “factor” is used as an outcome within the implications of factor analysis, then this indicates that SFA has been used. Another area of confusion is the word “factor” itself, which has different meanings depending on the kind of statistical analysis being used. In the analysis of variance, for example, the term “factor” refers to the independent variable, but in factor analysis and, more specifically, PCA, the word “factor” is not used and “component” is used instead.

There are three basic steps in the performance of PCA. The initial step is assessing the appropriateness of the data for factor analysis. This presents two problems that must be considered in ensuring whether the data is appropriate or not. The first one is the sample size of

the study, and the second one is the ability to form a relationship between the variables within the measuring element of the tool.

Concerning the sample size, there is no agreement as to how big a sample should be (Costello and Osborne, 2005). However, for doing factor analysis or PCA, a small sample size can be used, which could still be used to perform an appropriate and valid factor analysis. Some researchers recommend a proportion of the participants related to the number of items in the measurement tool that are to be reduced (Jolliffe, 2011). They recommend a ten to one ratio, so 10 subjects for each item to be looked at in the analysis. Others suggest five cases for each item (Kotrlík and Higgins, 2001). If a data set is within that range, it would be the bare minimum, and having between 100 and 200 subjects would probably be acceptable (Siegling, Saklofske and Petrides, 2015). Based on this argument, the target sample in this study meets the first requirement.

The second issue that was mentioned is the strong suite of inter-correlations between the elements within the measurement scale. The common norm is that these items need to have “bivariate correlations” of the value of 0.3 or higher (Fabrigar and Wegener, 2011). In a condition when there is only a limited number of correlations present in addition to this level, then factor analysis might not be appropriate. There are some statistical measures that were generated by the software, called SPSS, which can be a very important tool in establishing the most accurate route of the interrelationships. These measures are going to be discussed in more detail later. One of them is called “Bartlett's test of sphericity”, and the other one is the “Kaiser-Meyer-Olkin” (KMO), which is then used to measure the sampling for its designated adequacy. If we have a significant “Bartlett's test”, in other words the p-value, which is estimated should be less than 0.05, then that passes that suitability test. The “Kaiser Meyer-Olkin” measure ranges

from 0 to 1 and a value of 0.6 is the minimum possible value for a good “factor analysis” (Yong and Pearce, 2013).

The next step will be the actual factor extraction. This is used to make sure the most primitive of the values is used for the appropriate representation of the interrelationships between those different types of items. There are many different types of strategies that are then used to extract the number of components that are present. One of the most commonly used methods of extraction is PCA, which is to be incorporated within the following research. It is typically up to the researcher to determine the number of factors that he or she considers best to describe the underlying relationship. However, we have to balance things to comply with component analysis's assumptions. The first step is to find a simple explanation for the hypothesis with as few factors as possible. In other words, a tool that has the smallest number of factors or components, but we also want to make sure a complete picture is obtained and as much of the variance in the original data is explained as possible. Three measures can help determine how efficient and how in-depth the measurement of the variance is. The first is called Kaiser's criterion, the second one is called the scree test, and the third one is called parallel analysis (Costello and Osborne, 2005).

In Kaiser's criterion, an eigenvalue is used. The eigenvalue is the representation of the amount of the variance that is present for the component in its full value, as explained by the factor. If the items have eigenvalues of 1.0 or greater then they should be retained. The scree test involves plotting each of the eigenvalues of each of these items and inspecting the plot. The scatter plot is used to find a point at which the shape of the curve starts to change direction and becomes horizontal (see graph 5.1 in section 5.7.2.4). Parallel analysis is used to check the quality. It compares the size of the eigenvalues that are collected from the data to eigenvalues obtained from a randomly generated data set of the same size. Only the eigenvalues that are

greater in number than the randomly created eigenvalues are retained. This is similar to the concept where the research data compared to the null hypothesis. For which, the data value that exceed the value of null hypothesis, will then be retained and then used as a part of the model (Costello and Osborne, 2005). Hence for this research, the eigenvalue to be acceptable it must have a positive value of greater than 1.0. In this scenario, for the students and the participants to have a positive impact on the importance as well as the usage of the environmental factors, which is a contributing factor in the authenticity of this condition.

The next step is factor rotation and interpretation. It is the use of the number of components or items that are to be used for the study for the interpretation of the data. In order to help in the process of the interpretation of the data, the components of the data that are presented are then rotated, which called the loading of the data that is present. Therefore, this data is then used for easier interpretation. This is, in turn, the implication of the variables that is indicated in each factor which are presented together. In this regards, there are two elements which are considered to rotation. The first is the “uncorrelated” and the second is the “correlated” factors solution. The uncorrelated factors are the solutions that are incorporated easy to comprehend and to interpret. However one of the significant drawbacks for such element is the fact that it required the assumption that the underlying constructs or items are independents. construction. In contrast to that, the "correlation" factors are such that the following solutions allow the factors to be correlated as the name suggests. However, this makes the factors difficult to interpret (Kline, 2014; Costello and Osborne, 2005).

Regardless of the difference between these two approaches in interpretation difficulty, they often conclude a very similar scenario, and this has significance in the scenario where the patterns which are being followed by the correlation for the items present have a very clear

correlation. There have been studies conducted where both correlated and uncorrelated rotations are present, which will allow the report to be clear and concise and, therefore, the information is easier to understand.

5.7.2 Environmental Behaviour Factor Analysis

5.7.2.1 Data Analysis and Interpretation

The study was conducted among school students from various schools in Muscat Governorate of Sultanate of Oman. The population comprises 4000 students from Muscat and for the conduction of study the overall number of participants 212, the representative number of sample. Hence, for this reason, the sampling method that was adopted was very convenient. The most appropriate time frame to conduct the study was set as two months, from October to November 2017. With the help of a very detailed semi-structured questionnaire, primary data was collected (see appendix E). Hence the researcher has developed a keen mind in designing the questions which would be able to understand the level of comprehension as well as the ability to interpret information from the respondents.

The questionnaire used nine sections: demographics information, self-reported behaviour, self-reported attitude, assessed knowledge, self-reported knowledge, school mission, environmental education, knowledge sources, and awareness sources. The Likert learning scale was used in the questionnaire. The reliability of the instrument is named as Cronbach's Alpha, which has the value of 0.759. The response rate for the study was 100%, hence, 212 responses were received from the administered questionnaire. Principle Components Analysis was used with the intention of reducing the factors and identify the “core” variables that impact the students' self-reported environmental behaviours.

5.7.2.2 Data Cleansing Process

Data collected were subjected to a data cleansing process. The responses of all respondents were taken up for the data cleansing process. The process includes excluding any missing values. In all, there were 159 respondents who complete responses. The software that was used for this research was the “Software Package for Social Sciences”, which was used to run the data analysis. PCA was used to establish the factors that influenced school students’ environmental behaviours in the Sultanate of Oman. PCA necessitates a reliability test to be run to extract the variables from the data collection instrument.

5.7.2.3 Reliability Test

The questionnaire prepared was subject to Cronbach’s alpha test. The purpose of this test is to have an estimation of the internal consistency that is proposed for various variables and the ability to know how these different variables are bunched together as a single entity. The test score of the data collection instrument and the interpretation of the scores is displayed below.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of variables
.759	.766	23

Table 5.14: Reliability statistics

By looking at the Cronbach’s alpha score (table 5.14), it is evident that the internal consistency of the data collection instrument used is good and that the variables under study are closely related (Cohen et al., 2011).

5.7.2.4 Kaiser-Meyer-Olkin and Barlett Measure of Sampling Adequacy

Table 5.15 provides the significant parts of the output of SPSS; “Kaiser-Meyer-Olkin” (KMO), which is used for “sampling adequacy”, and “Bartlett's test for Sphericity”. The readings that are received from KMO have variance starting from the value of 0 to the value of 1. The value of 0 signifies that the relation between the partial correlation and the sum of correlation is very large, which could lead to the conclusion that factor analysis would be considered unsuitable, while the value that is closer to 1 shows the designated pattern of correlation is significantly compact.

This, in turn, indicates that the results obtained from the factor analysis are distinct and very reliable. Howard (2016) explained that values that are less than 0.49 are considered as unacceptable, while values in the range of 0.5 to 0.59 are called “miserable” values, the range between 0.6 and 0.69 is “mediocre” and the values between 0.7 and 0.79 are “middling”. The high category values are more acceptable, hence, the values between 0.8 and 0.89 are said to be “meritorious”, while the values from 0.9 to 1.00 are termed “marvellous”.

For the data collected for this research the value is 0.721 and is considered as middling, and hence, the data comfortably qualifies to conduct factor analysis (PCA).

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.721
Bartlett's Test of Sphericity	Approx. Chi-Square	738.600
	Df	253
	Sig.	.000

Table 5.15: KMO and Bartlett's Test

The “Bartlett’s measure test” measures the concept of the null hypothesis. This is in regards to the correlation matrix, which is used as an identity matrix. For PCA to be viable, it is necessary that there must be some relationships. In addition, the concept of R-matrix and its compatibility in being an identity matrix; in this situation, the coefficients of correlation would then be considered as zero. For this reason, the importance of the test arises, where it is ensured that the R-matrix cannot be considered as the identity matrix. Hence this implies that a sufficient relationship is established between the variables that are present. For the collected information, for the implementation of Bartlett's test, it can be seen that the test is of high quality hence the factor analysis performed is high quality as per the table above.

5.6.2.4 Descriptive Statistics for Factor Analysis

Due to some missing data in the responses of the 212 students, a sample of 159 responses was obtained, while nearly 4,000 school students in Oman represent the full data set for our factor analysis. The demographic profile generated for the samples is such that, out of all the participants selected, 31% were male while the other 69% were female. Considering school level, 38.3% are in grade 10, 50.3% are in grade 11, and the remaining 11.4 % are in grade 12.

The initial output from the factor analysis is the table 5.16 of descriptive statistics and communalities of the variables under investigation, which shows the standard deviation as well as the mean, which were calculated for the 159 respondents. It can be seen that the highest communality was such that 70.5% of respondents agree that they re-use bags or jars (X2); this has the mean of 3.5409 on a scale of 1 to 5. The second most important communality is found to be on the variable “I am a big champion of recycling and reuse of waste” (X17), with a value of 67.8% and a mean of 4.1258. The variables with the lowest communalities are “How much would you say you know about water quality?” (X23) and “How often do you do buy locally grown foods?” (X7) with communalities of 42.2% and 43.6% respectively.

Descriptive Statistics Communalities	Mean	Std. Dev.	N	Communalities
How often do you recycle things such as newspapers, cans, and glass? (X1)	2.5597	1.00373	159	0.497
How often do you do re-use bags or jars? (X2)	3.5409	1.33	159	0.705
How often do you do purchase lamps, light-bulbs and appliances that are energy efficient? (X3)	2.8805	1.21886	159	0.523
How often do you do run air conditioner less often in the summer? (X4)	2.8868	1.32159	159	0.535
How often do you do buy organic foods on a regular basis? (X5)	3.0881	1.26483	159	0.495
How often do you do buy dolphin friendly tuna? (X6)	2.434	1.19349	159	0.615
How often do you do buy locally grown foods on a regular basis? (X7)	3.5535	1.19941	159	0.436
How often do you participate in environmental protection activities e.g. litter-picking planting and recycling? (X8)	2.0377	1.24721	159	0.605
How often do you watch TV programs or read material about the environment? (X9)	2.956	1.4813	159	0.589
When there is a choice, I always choose the product that contributes to the least amount of environmental damage. (X10)	4.0818	1.00611	159	0.565
I have switched products for environmental reasons. (X11)	3.5723	1.07007	159	0.496
If I understand the potential damage to the environment that some products can cause, I do not purchase those products. (X12)	3.8616	1.15	159	0.568
Whenever possible, I buy products packaged in reusable or recyclable containers. (X13)	3.8428	0.97133	159	0.539
I have paid more for environmentally friendly products when there is a cheaper alternative. (X14)	3.3082	1.1526	159	0.639
Environmental pollution and degradation affect me. (X15)	4.3459	0.96119	159	0.585
The government should introduce harsh measures to curb pollution. (X16)	4.3333	0.99153	159	0.643
I am big champion of recycling and re-use of waste. (X17)	4.1258	1.05388	159	0.678
I would be willing to engage in personal sacrifices to stop environmental pollution and degradation (X18)	3.8679	1.12009	159	0.637
I consider myself highly knowledgeable about environmental issues. (X19)	3.6541	0.89998	159	0.544
How much would you say you know about environmental problems? (X20)	3.4591	0.95958	159	0.612
How much would you say you know about air pollution? (X21)	3.5597	0.99741	159	0.659
How much would you say you know about energy issues? (X22)	3.1132	1.06129	159	0.477
How much would you say you know about water quality? (X23)	3.5597	1.134	159	0.422

Table 5.16: Descriptive statistics and communalities

5.6.2.4.1 Correlation matrix

The correlation matrix investigates the dependence between multiple variables at the same time. The result is a table containing the correlation coefficients between each variable and the other variables. SPSS, by default, gives out the Pearson Correlation Coefficient, and it measures the linear dependence between two variables. Kendall and Spearman Correlation methods are non-parametric (conditional) rank-based correlation tests.

Table 5.17: Correlation matrix

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20	X21	X22	X23
X1	1.000	.146	.329	.134	.225	.240	.172	.130	.123	.099	.165	.100	.117	.069	.028	-.074	.184	.032	.223	.145	.128	.261	.062
X2	.146	1.000	.247	.017	.141	.035	.117	.083	.240	-.010	.048	.173	.164	.031	.021	.218	.150	.125	-.049	.003	.166	.077	.054
X3	.329	.247	1.000	.153	.278	.266	.323	.211	.071	-.033	.053	.096	.011	.035	-.013	-.072	-.008	.002	.343	.193	.186	.172	.072
X4	.134	.017	.153	1.000	.070	.051	.136	.214	-.022	.078	.019	.056	.001	.106	-.054	-.106	-.103	-.019	.089	-.044	.044	.050	.081
X5	.225	.141	.278	.070	1.000	.289	.214	.058	.259	.054	.140	.052	.171	.025	.006	-.013	.077	-.001	.155	.060	.126	.318	.045
X6	.240	.035	.266	.051	.289	1.000	.238	.116	.208	.102	.146	.035	.081	.224	.122	-.064	.087	.086	.211	.063	.188	.161	.025
X7	.172	.117	.323	.136	.214	.238	1.000	.189	.195	-.043	.052	.001	.021	-.046	.042	-.007	.040	.083	.290	.256	.184	.154	.143
X8	.130	.083	.211	.214	.058	.116	.189	1.000	.097	.098	.036	.114	-.073	.023	.026	.031	.011	.221	.209	.155	.019	.159	.021
X9	.123	.240	.071	-.022	.259	.208	.195	.097	1.000	.066	.160	.145	.132	.175	.189	.126	.081	.111	.150	.090	.188	.096	.015
X10	.099	-.010	-.033	.078	.054	.102	-.043	.098	.066	1.000	.303	.409	.214	.344	.213	.309	.259	.246	.045	.105	.169	.110	.109
X11	.165	.048	.053	.019	.140	.146	.052	.036	.160	.303	1.000	.296	.343	.380	.200	.201	.289	.174	-.010	.075	.066	.138	.126
X12	.100	.173	.096	.056	.052	.035	.001	.114	.145	.409	.296	1.000	.309	.338	.227	.346	.176	.384	.039	-.005	.035	.060	-.037
X13	.117	.164	.011	.001	.171	.081	.021	-.073	.132	.214	.343	.309	1.000	.332	.120	.357	.279	.283	.104	-.010	.137	.159	.023
X14	.069	.031	.035	.106	.025	.224	-.046	.023	.175	.344	.380	.338	.332	1.000	.166	.209	.228	.159	-.080	-.054	.047	-.008	-.026
X15	.028	.021	-.013	-.054	.006	.122	.042	.026	.189	.213	.200	.227	.120	.166	1.000	.303	.332	.366	-.066	-.015	.114	.023	.007
X16	-.074	.218	-.072	-.106	-.013	-.064	-.007	.031	.126	.309	.201	.346	.357	.209	.303	1.000	.359	.456	-.125	-.095	.009	.072	-.004
X17	.184	.150	-.008	-.103	.077	.087	.040	.011	.081	.259	.289	.176	.279	.228	.332	.359	1.000	.320	.060	-.014	-.025	.095	.153
X18	.032	.125	.002	-.019	-.001	.086	.083	.221	.111	.246	.174	.384	.283	.159	.366	.456	.320	1.000	.036	-.020	.044	.061	.059
X19	.223	-.049	.343	.089	.155	.211	.290	.209	.150	.045	-.010	.039	.104	-.080	-.066	-.125	.060	.036	1.000	.390	.330	.406	.210
X20	.145	.003	.193	-.044	.060	.063	.256	.155	.090	.105	.075	-.005	-.010	-.054	-.015	-.095	-.014	-.020	.390	1.000	.424	.259	.274
X21	.128	.166	.186	.044	.126	.188	.184	.019	.188	.169	.066	.035	.137	.047	.114	.009	-.025	.044	.330	.424	1.000	.352	.219
X22	.261	.077	.172	.050	.318	.161	.154	.159	.096	.110	.138	.060	.159	-.008	.023	.072	.095	.061	.406	.259	.352	1.000	.205
X23	.062	.054	.072	.081	.045	.025	.143	.021	.015	.109	.126	-.037	.023	-.026	.007	-.004	.153	.059	.210	.274	.219	.205	1.000

5.6.2.4.2 Communalities

PCA works on the initial assumption that all variance is common. Therefore, before extraction, the communalities are all 1. The communalities in the column labelled “Extraction” in Table 5.18 reflect the common variance in the data structure. Communalities explains the variance in common and is implied on a scale with a maximum of 1. Based on the PCA result for this data, it is found that if the value of communality is more than 0.47, then it will cause a good factor loading.

Table 5.18: Communalities

	Communalities	Initial	Extraction
X1	How often do you recycle things such as newspapers, cans, and glass?	1	0.497
X2	How often do you do re-use bags or jars?	1	0.705
X3	How often do you do purchase lamps, light-bulbs and appliances that are energy efficient?	1	0.523
X4	How often do you do run air conditioner less often in the summer?	1	0.535
X5	How often do you do buy organic foods on a regular basis?	1	0.495
X6	How often do you do buy dolphin friendly tuna?	1	0.615
X7	How often do you do buy locally-grown foods?	1	0.436
X8	How often do you participate in environmental protection activities e.g. litter- picking planting, and recycling?	1	0.605
X9	How often do you watch TV programs or read material about the environment?	1	0.589
X10	When there is a choice, I always choose the product that contributes to the least amount of environmental damage.	1	0.565
X11	I have switched products for environmental reasons.	1	0.496
X12	If I understand the potential damage to the environment that some products can cause, I do not purchase those products.	1	0.568
X13	Whenever possible, I buy products packaged in reusable or recyclable containers.	1	0.539
X14	I have paid more for environmentally friendly products when there is a cheaper alternative.	1	0.639
X15	Environmental pollution and degradation affect me	1	0.585
X16	The government should introduce harsh measures to curb pollution	1	0.643
X17	I am big champion of recycling and re-use of waste	1	0.678
X18	I would be willing to engage in personal sacrifices to stop environmental pollution and degradation	1	0.637
X19	I consider myself highly knowledgeable about environmental issues	1	0.544
X20	How much would you say you know about environmental problems?	1	0.612
X21	How much would you say you know about air pollution?	1	0.659
X22	How much would you say you know about energy issues?	1	0.477
X23	How much would you say you know about water quality?	1	0.422

Extraction Method: Principal Component Analysis.

The results in table 5.18 indicate that 70.5% of the variance of the variable “How often do you do re-use bags or jars (X2)” can be explained by the principal component. Also, the table shows that 67.8% of the variance to the statement “I am a big champion of recycling and re-use of waste (X17)” is explained by the principal component. Also, the variable presented by the statement “How much would you say you know about air pollution? (X21)” is well presented in the common factor space. The variance explained by the components for this factor is 65.9%. The components that highly explain these variables with high extraction values are presented in table 5.18.

5.6.2.4.3 Factor extraction

The output that is extracted with the help of the SPSS, as listed in Table 5.19, depicts the eigenvalue that has a strong relationship with the linear factor that was implicated before the extraction process, as well as after extraction and rotation. The number of linear components established before the extraction process was identified as 23 present within the data set. Each of the factors that are present within the variance are such that they have an eigenvalue associated on an individual basis. In addition, the variance also defines any designated linear components while the eigenvalues that are extracted are then displayed by the SPSS in terms of the percentage of the variance as explained. The component is explained as 10.44% of the value of the total variance. Hence, as per the workings of the SPSS, all the factors with a more significant value than 1 are extracted automatically. This leaves only seven factors which are then used for the experiment. Hence these eigenvalues that are synchronised are then used to display the factors in the columns that are labeled as a percentage of the variance. For this reason, the extracted eigenvalue is the sum value of the squared loadings, which are same as the eigenvalues determined before the rotation value, which turned out to be 16.82%. For this reason, the discarded values will then be easily ignored. It is evident from table 5.19, that the eigenvalues in the extracted sum of squared loadings, 16.82%, are different

from the eigenvalues after rotation, 10.44%. Before rotation, factor 1 accounted for more variance, at 16.82%, than the remaining factors. However, after extraction/rotation, it accounts for only 10.44% of the variance. Similarly, factor 2 accounted for 12.46% of the variance prior to rotation. Thus, 56.80% of the cumulative variance is contributed by the first seven variables (X1, X2, X3, X4, X5, X6 and X7) and remaining factors contribute only 43.19% of cumulative variance.

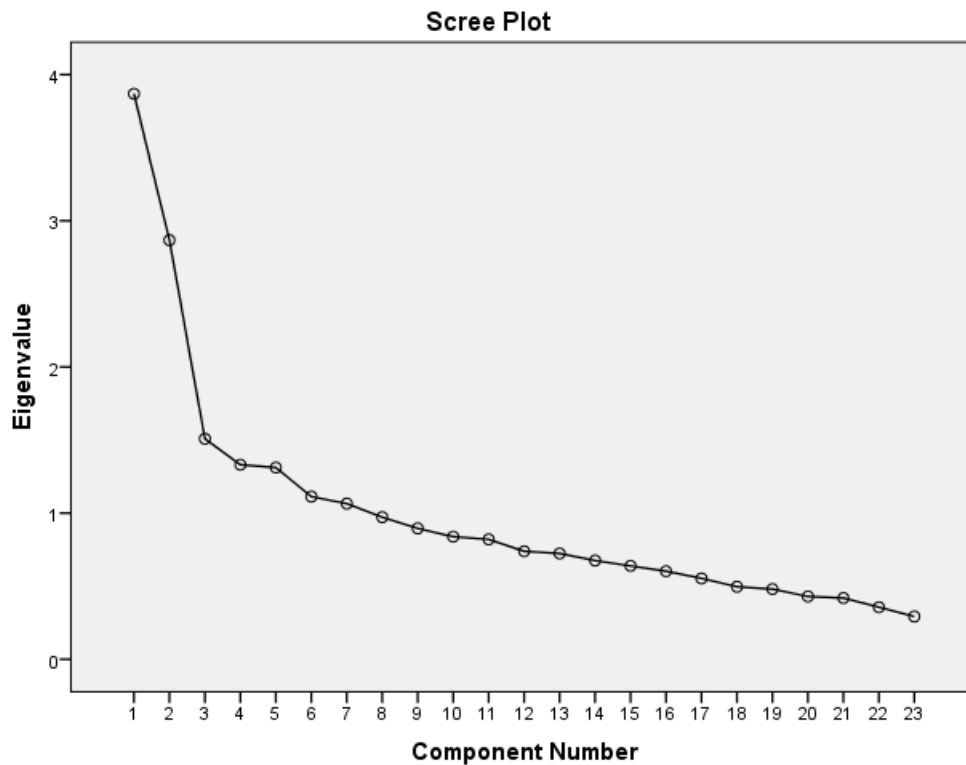
Table 5.19: Factor extraction -Total variance explained

Component	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
X1	3.869	16.822	16.822	3.869	16.822	16.822	2.401	10.441	10.441
X2	2.867	12.467	29.289	2.867	12.467	29.289	2.324	10.104	20.545
X3	1.509	6.560	35.849	1.509	6.560	35.849	2.100	9.131	29.676
X4	1.331	5.786	41.635	1.331	5.786	41.635	2.019	8.780	38.456
X5	1.312	5.703	47.338	1.312	5.703	47.338	1.516	6.592	45.048
X6	1.113	4.839	52.177	1.113	4.839	52.177	1.356	5.898	50.946
X7	1.065	4.631	56.808	1.065	4.631	56.808	1.348	5.862	56.808
X8	.972	4.226	61.034						
X9	.896	3.894	64.927						
X10	.839	3.646	68.574						
X11	.820	3.567	72.140						
X12	.739	3.213	75.354						
X13	.724	3.148	78.502						
X14	.675	2.937	81.439						
X15	.639	2.778	84.216						
X16	.602	2.619	86.835						
X17	.553	2.406	89.241						
X18	.496	2.158	91.398						
X19	.481	2.089	93.488						
X20	.430	1.868	95.355						
X21	.419	1.822	97.177						
X22	.357	1.550	98.727						
X23	.293	1.273	100.000						

Extraction Method: Principal Component Analysis

Scree plot

The scree plot is a graph that shows the eigenvalues against all factors/variables extracted by SPSS. Factors with an eigenvalue of more than one are considered as statistically reliable factors.



Graph 5.1: *Scree plot*

From the scree plot, seven factors are identified with eigenvalues greater than one. The factors that cause the variance are explained with the help of a steep fall of the curve. The steep fall explains the high variance, and flat part of the curve shows the low variance, as can be understood by comparing table 5.21 (Factor extraction) and graph 5.1 (Scree plot).

Seven principal components extracted with eigenvalue greater than one							
	1	2	3	4	5	6	7
I have switched products for environmental reasons. (B1)	0.52						
If I understand the potential damage to the environment that some products can cause, I do not purchase those products. (B2)	0.52						
Whenever possible, I buy products packaged in reusable or recyclable containers. (B3)	0.52						
When there is a choice, I always choose the product that contributes to the least amount of environmental damage. (B4)	0.5						
I would be willing to engage in personal sacrifices to stop environmental pollution and degradation. (B5)	0.49						
How much would you say you know about energy issues? (B6)							
How much would you say you know about air pollution? (B7)							
How often do you recycle things such as newspapers, cans, and glass? (B8)							
How often do you do buy organic foods on a regular basis. (B9)							
I consider myself highly knowledgeable about environmental issues. (B10)		0.57					
The government should introduce harsh measures to curb pollution. (B11)		-0.6					
How often do you do purchase lamps, light-bulbs and appliances that are energy efficient? (B12)							
How often do you do buy locally-grown foods on a regular basis? (B13)							
How much would you say you know about environmental problems? (B14)			-0.5				
How much would you say you know about water quality? (B15)			-0.5				
How often do you do re-use bags or jars? (B16)				0.52		0.48	
I have paid more for environmentally friendly products when there is a cheaper alternative. (B17)							
How often do you participate in environmental protection activities e.g. litter- picking, planting, and recycling? (B18)					0.67		
How often do you do run air conditioner less often in the summer? (B19)							
Environmental pollution and degradation affects me. (B20)						-0.5	
How often do you do buy dolphin friendly tuna? (B21)							
I am big champion of recycling and re-use of waste. (B22)							-0.5
How often do you watch TV programs or read material about the environment? (B23)							

Extraction Method: Principal Component Analysis.

Table 5.20: Component Matrix – before rotation (Note: The variables are coded in the ‘B’ series before rotation)

The component matrix before rotation, shown in table 5.20, contains the loadings of each variable into different factors/components and displays the loadings of 23 variables on seven factors/components extracted. However, it was observed from the table that there were cross loadings, and the loadings were not appropriately distributed and are not statistically significant. Therefore, the researchers resorted to varimax rotation. The value of the loading is relative to the importance of the variable as the contributing factor, hence, the higher the absolute value of the loading, the more the variable contribution to these factors. For the seven factors which are removed where the 23 variables are divided into seven factors/components according to the essential items with similar responses in factors/component 1 to 7.

However, according to Kaiser's criterion, seven factors are to be extracted and considered accurate. It is considered accurate when the average communalities are higher than 0.62. However, the average of the communalities is found by adding the communalities and dividing by the number of factors ($13.064/23 = 0.568$).

Under exploratory factor analysis, in social sciences research, communalities above 0.3 are considered to be acceptable for establishing a relationship with the dependent variable. In this study, the minimum/lowest communality is found to be 0.422 from table 5.18. Therefore, the researchers subjected the data to be rotated to arrive at seven factors/components on which other variables can be conveniently loaded.

Rotated Component Matrix							
	Components						
	1	2	3	4	5	6	7
I have paid more for environmentally friendly products when there is a cheaper alternative. (R1)	0.755						
When there is a choice, I always choose the product that contributes to the least amount of environmental damage. (R2)	0.665						
I have switched products for environmental reasons. (R3)	0.617						
If I understand the potential damage to the environment that some products can cause, I do not purchase those products. (R4)	0.580						
Whenever possible, I buy products packaged in reusable or recyclable containers. (R5)	0.538						
How much would you say you know about environmental problems? (R6)		0.760					
How much would you say you know about air pollution? (R7)		0.693					
I consider myself highly knowledgeable about environmental issues. (R8)		0.632					
How much would you say you know about water quality? (R9)		0.567					
How much would you say you know about energy issues? (R10)		0.566					
I would be willing to engage in personal sacrifices to stop environmental pollution and degradation. (R11)			0.707				
I am big champion of recycling and re-use of waste. (R12)			0.673				
Environmental pollution and degradation affect me. (R13)			0.661				
The government should introduce harsh measure to curb pollution. (R14)			0.591				
How often do you recycle things such as newspapers, cans, and glass? (R15)				0.659			
How often do you do buy organic foods on a regular basis? (R16)				0.629			
How often do you do purchase lamps, light-bulbs and appliances that are energy efficient? (R17)				0.523			
How often do you do buy dolphin friendly tuna? (R18)				0.507			
How often do you participate in environmental protection activities e.g. littering, planting, and recycling? (R19)					0.741		
How often do you do run air conditioner less often in the summer? (R20)					0.603		
How often do you watch TV programs or read material about the environment? (R21)						0.702	
How often do you do re-use bags or jars? (R22)							0.799

Table 5.21: Rotated Component Matrix (Note: The variables are coded in the ‘R’ series after rotation)

For all the values less than 0.47, it is such that the readings are inclined towards the output to eliminate cross loadings.

The researchers used Varimax Orthogonal Rotation to achieve uncorrelated factors in the analysis. The factor loadings that were obtained after the rotation are laid out in the columns labelled as Rotated Component Matrix. There are seven components identified by the SPSS, and the factor loadings are represented in table 5.21. The factor rotation procedure resulted in the following factors.

There were five variables R1, R2, R3, R4, and R5 heavily loaded on to the *first factor* and it relates to: “I agree to be more interested in the environmentally friendly products, even though the price is higher and there are cheaper alternatives available for the said products. (R1)”; “where there is a choice I will always prefer the products that are most environmentally friendly and induce the least amount of harm to the environment (R2)”; “the reason for switching the products is mainly for the reasons related to the environment (R3)”; “if environmental damages are known to me, I do not purchase such products which are causing damage to the environment (R4)”; “it is my utmost priority to buy products that have the option of recycling or any reusable containers (R5)”. The factor loadings of R1, R2, R3, R4 and R5 are 0.755, 0.665, 0.617, 0.580 and 0.538 respectively. The main concept connect these five variables is participant’s environmental behaviour. Therefore, the *first factor* is labelled as “*Self-reported environmental behaviour* (see table 5.22).

The five variables R6, R7, R8, R9, and R10 that load heavily on the *second factor* relate to “How much would you say you know about environmental problems? (R6)”; “how much would you say you know about air pollution? (R7)”; “I consider myself highly knowledgeable about environmental issues (R8)”; “How much would you say you know about water quality? (R9)”; and “How much would you say you know about energy issues? (R10)”. The main idea connects these variables is the participants’ knowledge about the environment. Therefore, the

second factor is labelled as “*Self-reported environmental knowledge*”. The factor loadings of R6, R7, R8, R9 and R10 are 0.760, 0.693, 0.632, 0.567 and 0.566 respectively.

The variables R11, R12, R13 and R14 that load heavily on the *third factor* relate to: “I would be willing to engage in personal sacrifices to stop environmental pollution and degradation (R11)”; “I am a big champion of recycling and re-use of waste (R12)”; “Environmental pollution and degradation affects me (R13)”; and “The government should introduce harsh measure to curb pollution (R14)”. The main idea connects these variables is the participants’ attitudes toward the environment. Therefore, the *third factor* is labelled as “*Environmental attitude*”. The factor loadings of R11, R12, R13 and R14 are 0.707, 0.673, 0.661 and 0.591 respectively.

The four variables R15, R16, R17 and R18 that load on the *fourth factor*, relates to: “How often do you recycle things such as newspapers, cans, and glass? (R15)”; “How often do you do buy organic foods regularly? (R16)”; “How often do you do purchase lamps, light-bulbs, and appliances that are energy efficient? (R17)”, and “How often do you do buy dolphin friendly tuna? (R18)”. The main idea connects these variables is participants’ friendly beaviours towards the environment. Therefore, the *fourth factor* is labelled as “*Pro-Environmental behaviour*”. The factor loadings of R15, R16, R17 and R18 are 0.659, 0.629, 0.523 and 0.507 respectively.

The variables R19 and R20 that load on the *fifth factor* relate to: “How often do you participate in environmental protection activities, e.g., litter- picking, planting, and recycling? (R19)”; and “How often do you run air conditioner less often in the summer? (R20)”. The main idea connects these two variables is the participants’ self- discipline for conserving the environment. Therefore, the *fifth factor* is labelled as “*Self-regulations for environmental protection*”. The factor loadings of R19 and R20 are 0.741, and 0.603 respectively.

The variable R21 that loads on the *sixth factor* relates to “How often do you watch TV programs or read material about the environment? (R21)”. The main idea underling this variable is the activities or actions to got knowledge about the environment. Therefore, the *sixth factor* is labelled as “*Knowledge sought on the environment*”. The factor loading of R21 is 0.702.

The variable R22 that loads on the *seventh factor* relates to “How often do you do re-use bags or jars? (R22)”. The main idea underline this variable is the participants’ inititives in reusing products. Therefore, the *seventh factor* is labelled as “*Re-using initiative*”. The factor loading of R22 is 0.799.

The analysis of the data proves that the initial questionnaire prepared comprises seven overriding factors on to which other variables/factors are loaded. They are:

S.No.	Factors/Components	Converge to:
1	Self-reported environmental behavior	Environmental Behavior
2	Self-reported environmental knowledge	
3	Environmental attitude	
4	Pro-environmental behaviours	
5	Self-regulations for environmental protection	
6	Knowledge sought on environment	
7	Initiative of Re-using products	

Table 5.22: Factor/component labelling

5.7 Findings, Conclusions and Suggestions

Findings

1. The Cronbach's alpha measure of the reliability of the data collection instrument was 0.759 and is considered to be good, according to the Cronbach’s interpretation.
2. The Kaiser-Meyer-Olkin measure of sampling adequacy returned a value of 0.721 and is considered to be “middling” to run factor analysis.

3. Bartlett's test of sphericity returned a measure of 0.000, which is highly significant and is considered to be very appropriate to run factor analysis.
4. By comparing the mean values and highest communalities, it was found that 70.5% of respondents agree that they re-use bags or jars (X2). This has the mean of 3.54 on a scale of 5.
5. The second most crucial communality was found to be on the variable "I am a big champion of recycling and reuse of waste (X17)", with the next highest communality of 67.8% and a mean score of 4.12.
6. 70.5% of the communality is attributed to the statement "How often do you do re-use bags or jars (X2)"; 67.8% of the variance is attributed to the statement "I am a big champion of recycling and re-use of waste (X17)"; 65.9% of the variance is attributed to the statement "How much would you say you know about air pollution? (X21)" (see table 5.20).
7. Factor/component 1 explains 10.44% of the total variance (see table 5.21). Before rotation, factor 1 accounted for more variance (16.82%), than the remaining six factors.
8. Factor/component 2 accounts for 12.46% of the variance.
9. 56.808% of the cumulative variance is contributed by the first seven variables (X1, X2, X3, X4, X5, X6 and X7) and the remaining factors contribute only 43.19% of cumulative variance (see table 5.21).
10. There were five variables, R1, R2, R3, R4 and R5, heavily loaded on to the first factor, relating to: environmentally friendly products (R1), least environmental damage (R2), switched products for environmental reasons (R3), not purchasing products that cause potential damage to the environment (R4) and buying products that are reusable or recyclable (R5). Therefore, the first factor is labelled as "Self-reported environmental behaviour". The factor loadings of R1, R2, R3, R4 and R5 are 0.755, 0.665, 0.617, 0.580 and 0.538 respectively.

11. The four variables R6, R7, R8, R9 and R10 that load heavily on the second factor relate to: knowledge on environmental problems (R6), air pollution (R7), environmental issues (R8), water quality (R9), and energy issues (R10). Therefore, the second factor is labelled as “Self-reported environmental knowledge”. The factor loadings of R6, R7, R8, R9 and R10 are 0.76, 0.69, 0.63, 0.56 and 0.56 respectively.
12. The variables R11, R12, R13 and R14 that load heavily on the third factor relate to: willingness to engage in sacrifices to stop environmental pollution and degradation (R11), recycle and re-use of waste (R12), environmental pollution and affects of degradation (R13) and measures to curb pollution (R14). Therefore, the third factor is labelled as “Environmental attitude”. The factor loadings of R11, R12, R13 and R14 are 0.707, 0.673, 0.66 and 0.59 respectively.
13. The variables R15, R16, R17 and R18 that load on the fourth factor relate to: the frequency of recycling things such as newspapers, cans, and glass (R15), buying organic foods (R16), purchasing lamps, light-bulbs and appliances that are energy efficient (R17) and buying dolphin friendly tuna (R18). Therefore, the fourth factor is labelled as “Environment friendly behaviour”. The factor loadings of R15, R16, R17 and R18 are 0.65, 0.62, 0.52 and 0.50 respectively.
14. The variables R29 and R20 that load on the fifth factor relate to: the frequency of participation in environmental protection activities (R19) and not/less usage of air conditioners in summer (R20). Therefore, the fifth factor is labelled as “Self-regulations for environmental protection”. The factor loadings of R20 and R21 are 0.741 and 0.60 respectively.
15. The variable R21 that loads on the sixth factor relates to the inquisitiveness in knowing and reading about the environmental issues (R21). Therefore the sixth factor is labelled as “Knowledge sought on the environment”. The factor loading of R21 is 0.70.

16. The variable R22 that loads on the seventh factor relates to the reuse of bags and/or jars (R22). Therefore, the seventh factor is labelled as “Recycling initiative”. The factor loading of R22 is 0.79.

5.8 Chapter Summary

Chapter 5 incorporated a quantitative analysis that was used for the current study. The quantitative analysis was performed using SPSS software. The study was conducted using 212 questionnaires with students. The responses obtained from these individuals were then run through the statistical software which was able to provide the significant result for the following result. The upcoming chapter will be focused on the qualitative data analysis.

CHAPTER 6: DATA ANALYSIS AND RESULTS – INTERVIEWS DATA

6.1 Chapter Overview

The process of qualitative data analysis and the results of the interview data are presented in this chapter in the following sections. Firstly, it presents a detailed process of data transcription. Secondly, it outlines the process of conducting the analysis of the research interviews. Thirdly, it outlines the participants' demographic information. Finally, it presents the results of interviews.

6.2 Interview Data Transcription

Transcription of interview data is one of the most common ways to prepare it for analysis (Bazeley and Jackson, 2013). The course of interviews was conducted in Oman in March 2018. The sample consisted of 13 students, 8 teachers and 4 heads of schools from four different schools namely: AL-Hassan bin Hashim schools for boys, South AL-Mabellah School for girls, Al-sheikh Hamdan AL-Yousfi School for boys and Hail AL-Awamer School for girls.

The data analysis of the interviews of this research started in April 2018 with a transcription of the recorded interviews to an MS Word document. The second procedure was translating the whole transcripts from Arabic to the English language, which was done by the researcher of this study. The translation has been double-checked by another author who is fluent in Arabic and English languages. In line with the views of Kowal and O'Connell (2014) standardised rules of transcription were employed to ensure that participants' pauses, use of slang, notations of emotional content, such as whispering, were conserved, ensuring that the transcript reflected as accurately as possible the views of the participants and that the possibility of misrepresentation was minimised. Standardised rules also ensured that transcripts followed the same presentational format. To guarantee the quality of the transcription and to eliminate any errors, it was decided that all transcripts were to be checked against the original interview

recording. Although no problems were highlighted with the quality of the transcript provided by the second reviewer, this was beneficial, not only to make any necessary amendments or corrections but also to re-familiarise with the data to assist with the data analysis process. All students', teachers', and heads of schools' identifiers were removed at this point to ensure participant confidentiality. In other words, the researcher of this study has coded each participant with a specific code. In addition, to assist with the transcribing of the interviews, the second reviewer was sent a summary of the study's proposal to familiarise themselves with the content of the interviews and some of the terminology that he may encounter.

6.3 Computer Assisted Qualitative Data Analysis (CAQDA)

In order to manage large amounts of qualitative data in a systematic way and to ensure efficient retrieval of that data, a number of computer software packages have been developed. Whilst such packages help to assist with the data analysis process, they are not an alternative to the researchers' time, effort and skills but have been viewed as a means of enhancing the rigour of qualitative studies (Bazeley and Jackson, 2013) and can encourage proximity of the researcher with the data (Pope et al., 2000). For these reasons, following the transcription of interviews into MS Word, data was stored and managed using specialist software for qualitative data, the QRS programme (NVivo-12); See figure 6.1 coding interview's responses.

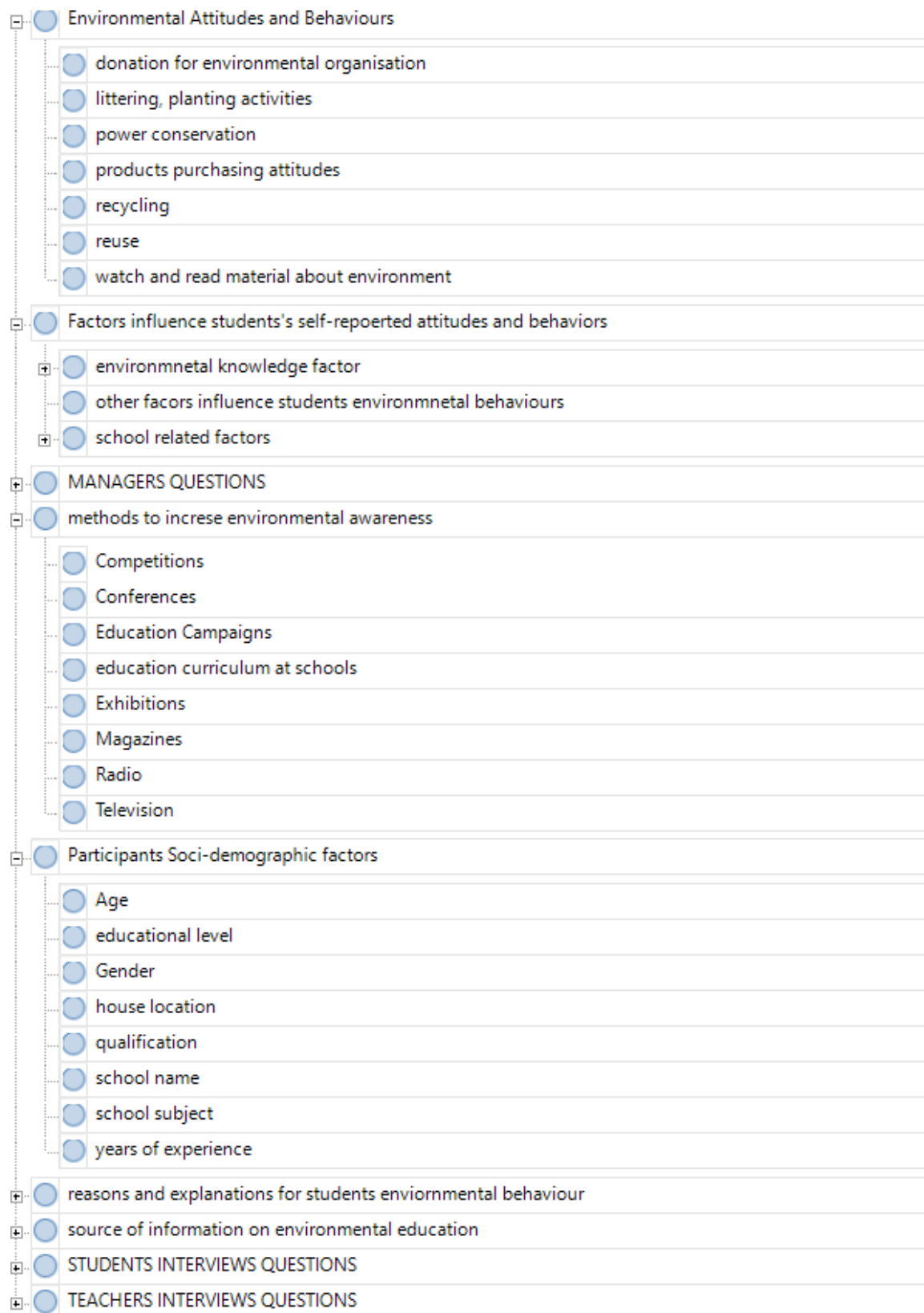
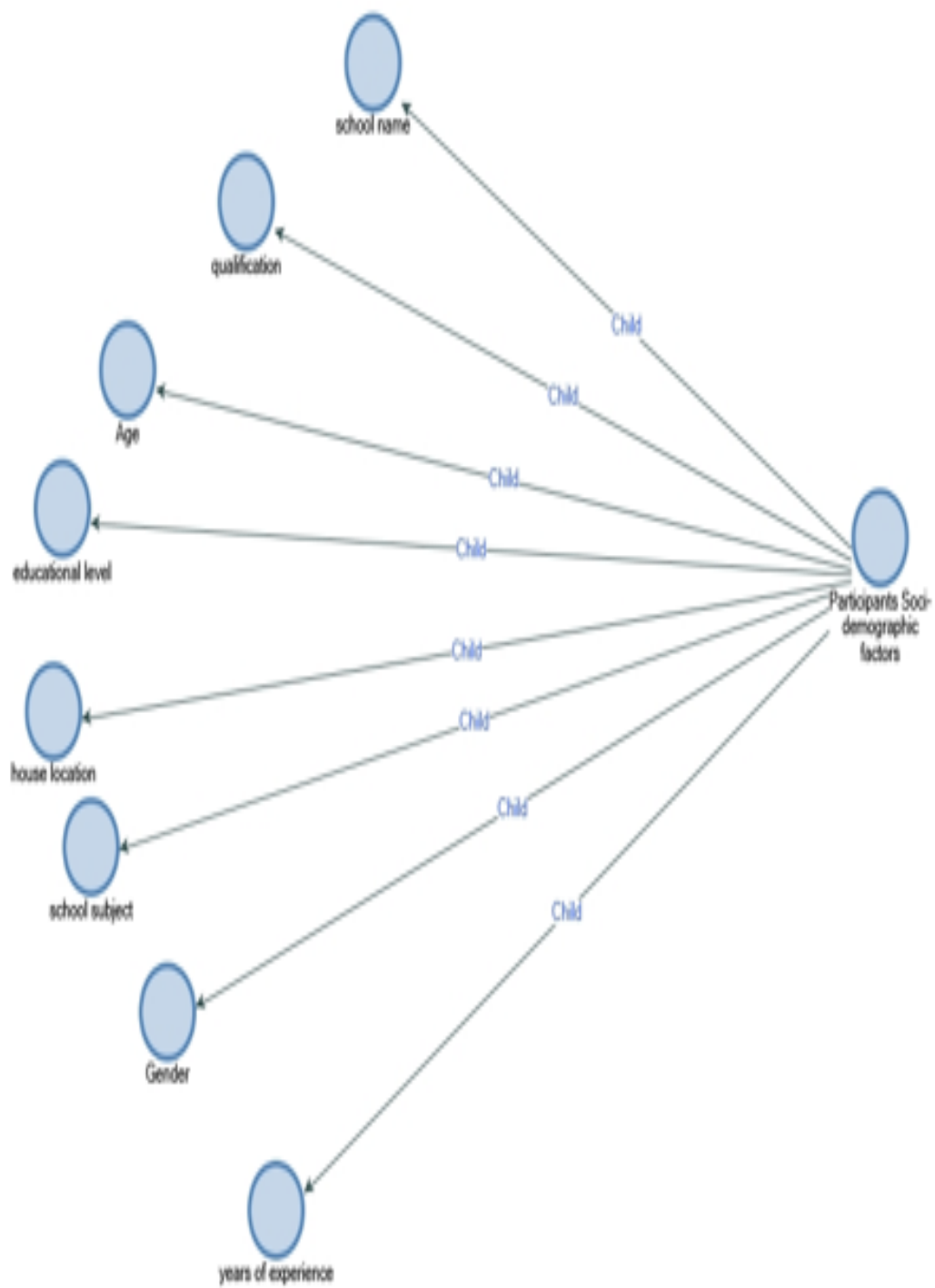


Figure 6.1: Coding interviews' responses

6.4 Interview Data Analysis Using a Thematic Approach

The interview data were analysed through adapting the thematic analysis process of Braun and Clarke (2006). In order to generate the initial codes of the data, line by line coding was conducted. The whole data set was grouped together under similar codes and then sorted into first categories. This process helps the researcher to create the initial main themes of the qualitative data of this study. The analysis, called the “Saliency analysis” (Buetow, 2010), describes the themes, incorporating the themes as well as the frequency of the associated data. This, in turn, indicates the importance of the themes. The designated themes are be used for the purpose of supporting a statement that can be associated with the participants. These statements are then used to define the themes such as “the most important”. Hence it is important to focus on the number of participants that have raised this designated theme. Hence it can be said that it is not dependent on the frequency of the comments necessarily. There is a high chance of a theme being rejected if the designated theme is neither frequent nor salient in nature (Buetow, 2010). The themes that are not rejected are then defined, refined, reviewed and then considered for the purpose of the theme map, as shown in figure 6.2. In addition, at all stages, those which are left are “peer reviewed”, that is they are acknowledged by another author who allows the quotations, using the concept of “member checking”, which is then defined by the designated participants, as depicted by Robson (2002). The designated element is then completed with the help of email and phone. As depicted by the comments of the second reviewer. This is further completed by the re-reading of the transcripts to ensure that all the elements of the original data are then supported.





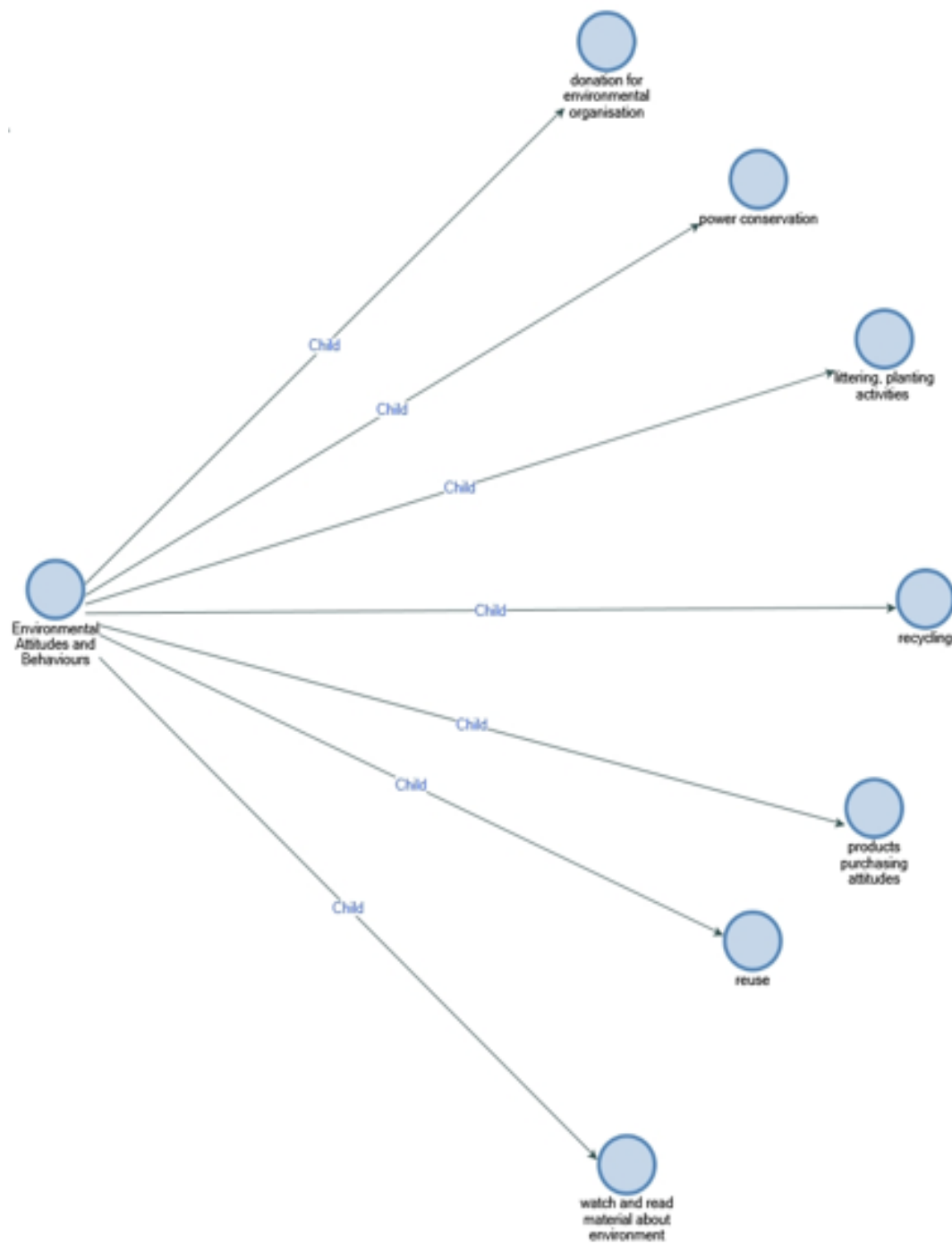


Figure 6. 2: Qualitative data theme map

“The process of Theming the interviews Transcription”

6.4.1 Interviews Questions Content

This study involved qualitative interviews in exploring the participants' perceptions and awareness about environmental education, their environmental attitudes and behaviours and the factors that affect their environmental attitudes and behaviours.

Within the interviews with Omani students, teachers, and heads of schools, a standard semi-structured qualitative interview approach incorporating open-ended and close-ended questions were employed.

Students' interview questions focused on the following issues:

- a- Their understanding of environmental education and the importance of it.
- b- Their environmental knowledge and exploring the factors that raise it.
- c- Exploring and understanding their environmental attitudes and behaviours.
- d- Exploring and understanding the factors that influence their environmental attitudes and behaviours.

Interview Topic Guide
<p>Topic areas to be discussed with students:</p> <p>Demographic information about participants</p> <p><i>Participant's gender</i></p> <p><i>Participant's age</i></p> <p><i>School name</i></p> <p><i>Household location</i></p> <p>Participant's awareness about environmental education</p> <p><i>Explore their awareness and understanding of the term environmental education.</i></p> <p>Participant's self-reported environmental attitudes and behaviours</p> <p><i>Explore their decision-making preferences at various living style choices</i></p> <p>Factors influencing student's environmental attitudes and behaviours</p> <p><i>Explore the factors within the schools that influence student's environmental attitudes and behaviours</i></p>

Figure 6.3: Interview Content with Students

Teachers' interview questions focused on the following issues:

- a- The role of the environmental curriculum and the importance of it.
- b- Topics covered within environmental subjects at schools
- c- Their perception in introducing a separate environmental subject at Omani schools.
- d- The understating of environmental education concepts.

e- Their school's mission.

Interview Topic Guide
<p>Topic areas to be discussed with teachers:</p> <p>Demographic information about participants</p> <p><i>Participants' gender</i></p> <p><i>Participants years of experience</i></p> <p><i>School name</i></p> <p><i>School subject</i></p> <p><i>Qualification</i></p> <p>Participant's awareness about environmental education</p> <p><i>Explore their awareness and understanding of the term environmental education.</i></p> <p>Participant's awareness of their school's mission</p> <p><i>Explore their knowledge of their school's mission</i></p> <p>Factors influencing student's environmental attitudes and behaviours</p> <p><i>Explore the factors within the schools that influence student's environmental attitudes and behaviours</i></p>

Figure 6.4: Interview Content with Teachers

Heads of schools' interview questions focused on the following issues:

- a) Their understanding of environmental education and the importance of it.
- b) They know their school's mission.

Interview Topic Guide
<p>Topic areas to be discussed with heads of schools:</p> <p>Demographic information about participants</p> <p><i>Participant's gender</i></p> <p><i>Participant's years of experience</i></p> <p><i>School name</i></p> <p><i>School subject</i></p> <p><i>Qualification</i></p> <p>Participant's awareness about environmental education</p> <p><i>Explore their awareness and understanding of the term environmental education.</i></p> <p>Participant's definition of their school's mission</p> <p><i>Explore what is their school's mission</i></p> <p>Factors influencing student's environmental attitudes and behaviours</p> <p><i>Explore the factors within the schools that influence student's environmental attitudes and behaviours</i></p>

Figure 6.5: Interview Content with Heads of Schools

6.5 Participants' Demographic Information

In the first phase of the interview the participants are asked the “socio-demographic” questions. The questions which were directed to the students addressed age, gender, school name, education level and household location; whereas those to the teachers and heads of schools addressed school name, qualification, years of experience, gender, and name of the subjects they teach. See Table 6.1 for participant information.

Participant's Code	Age	Gender	Grade level	Household Location	School Name	School Code
S1	17	Male	12	Urban	Al-Hassan bin Hashem School for Boys	A
S2	18	Male	12	Urban	Al-Hassan bin Hashem School for Boys	A
S3	17	Male	11	Urban	Al-Hassan bin Hashem School for Boys	A
S4	17	Female	12	Urban	Al-Mabila South School for Girls	B
S5	17	Female	12	Urban	Al-Mabila South School for Girls	B
S6	18	Female	12	Urban	Al-Mabila South School for Girls	B
S7	17	Female	11	Urban	Al-Mabila South School for Girls	B
S8	16	Male	11	Urban	AL-Sheikh Hamdan bin Khamis Al-Youssifi School for Boys	C
S9	15	Male	10	Urban	AL-Sheikh Hamdan bin Khamis Al-Youssifi School for Boys	C
S10	16	Male	11	Urban	AL-Sheikh Hamdan bin Khamis Al-Youssifi School for Boys	C
S11	16	Female	11	Urban	Hail Al-Awamer School for Girls	D
S12	17	Female	12	Urban	Hail Al-Awamer School for Girls	D
S13	17	Female	12	Urban	Hail Al-Awamer School for Girls	D

Table 6.1: Students' background information, S: Student

Participant's Code	Qualification	Years of experience	Gender	School Name	School Code
HS A	Master's degree in educational leadership	26	Male	Al-Hassan bin Hashem School for Boys	A
HS B	Bachelor's Degree in Arabic Education	1	Female	Al-Mabila South School for Girls	B
HS C	Bachelor's degree in physics and Math Education	18	Male	AL-Sheikh Hamdan bin Khamis Al-Youssifi School for Boys	C
HS D	Bachelor's degree in Arabic literature and Education	17	Female	Hail Al-Awamer School for girls	D

Table 6.2: Heads of schools' information, HS: Head of School.

Participant's Code	School Subject taught	Years of experience	Gender	School Name	School Code
T1	Geography	13	Male	Al-Hassan bin Hashem School for Boys	A
T2	This is my National	2	Male	Al-Hassan bin Hashem School for Boys	A
T3	This is my National	13	Female	Al-Mabila South School for Girls	B
T4	English	9	Female	Al-Mabila South School for Girls	B
T5	Social studies	9	Male	AL-Sheikh Hamdan bin Khamis Al-Youssifi School for Boys	C
T6	Public science	17	Male	AL-Sheikh Hamdan bin Khamis Al-Youssifi School for Boys	C
T7	Economic geography	24	Female	Hail Al-Awamer School for girls	D
T8	Environmental science & physics	18	Female	Hail Al-Awamer School for girls	D

Table 6.3: Teachers' information T: Teacher

6.5.1 Participants' Age

Thirteen interviewees were students from four different schools in Oman. The interviewees' ages ranged from 15 to 18 years old. This reflects the age range of the students at secondary school levels. One interviewee was aged 15, three were 16, seven were 17 and two were 18. Teachers and heads of schools were not asked about their age.

6.5.2 Educational level

It was noted during the course of the interviews that most of the student interviewees were from grades 11 and 12. The rest of the students were from grade 10. This is due to the time that these interviews were conducted in March, which is the beginning of the second semester in Omani schools. At this time, most of the students, especially from grade 12, were available to participate in this research.

Moreover, the educational levels of the eight teachers and four heads of schools have been included in the data. Three of the heads of schools were from one educational level and one head of school had a higher level of education. Head of school A holds a master's degree in educational leadership. Both heads of schools B and D hold a bachelor's degree in Arabic education, whereas, head of school C holds a bachelor's in physics and mathematics education. In regards to the teachers' educational level, all teachers have a bachelor's degree. Teacher 1 from school A teaches geography. Both teacher 2 from school A and teacher 3 from school B teach the same subject, "This Is My National", whereas teacher 4 from school B teaches English. Teacher 5 from school C teaches social studies, and teacher 6 from the same school teaches public science. Teacher 7 from school D teaches economic geography and teacher 8 teaches environmental science. See table 6.2 Heads of schools' educational level and table 6.3 teachers' educational level.

6.5.3 Gender

A mix of male and female participants were interviewed. The qualitative data were collected through a total of 25 interviews, with 13 female and 12 male participants. The researcher tried to balance between male and female participants to make sure that the size of the sample depicts both genders.

6.6 Awareness of Environmental Education

The research question for this study: “What are schools’ factors that influence student’s self-reported environmental attitudes and behaviours within and outside the Omani secondary schools” led to the development of interview questions about participants’ experiences with pro-environmental behaviours and how they perceived environmental education. In order to be able to grasp the concepts of environmental education fully, an understanding of participants’ perceptions of environmental education was needed. These perceptions encompassed the students’ and the heads of the schools’ perceptions of environmental education. The analysis of students’ and heads of schools’ awareness of environmental education led to the sub-categories: (1) curriculum about environment; (2) natural environment; (3) environmental problems; and (4) awareness about the environment.

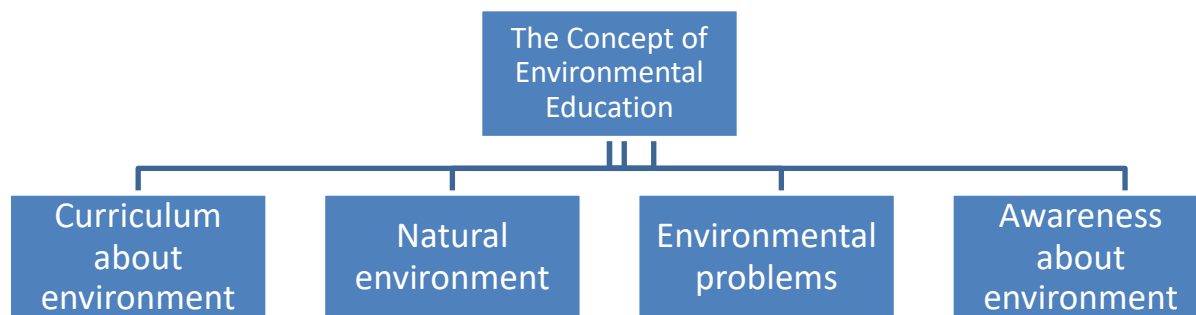


Figure 6.6: *The main concepts or definitions of environmental education among participants' responses*

6.6.1 Curriculum about the Environment

For the most part, students and heads of schools had similar awareness about environmental education. Both groups perceived environmental education as a school curriculum about the environment. For instance, to the question “what is environmental education?”, head of school A replied:

“For me, I have not been exposed to the environmental education but from my own point of view, it is the education that is taken from the environment itself and uses the environmental factors in learning and teaching. What is environmental education or environmental bringing-up? Environmental education is the education that depends on the environment and use of the same in education. Yes, the environment is a part of school curricula as seen in some examples in the school such as life skills, geography, Arabic texts, and Islamic education, and even in English language texts. There are some texts talking about this matter in addition to other school subjects. It also tackles the matter of spreading awareness amongst the Omani people and how to preserve and develop the environment and their country achievement. This also has something to do with sustainable development.”

Head of school C offered a broader awareness noting:

“It is the curriculum that is concerned about the issues of the environments. Here in Oman, in the past, there was a curriculum concerned with this matter. But now the students can choose what subjects they want to study. There was a subject called ‘Environmental Sciences’. In the past, in the year 2000, there was a subject related to science talking about the sciences of environments. It was addressing the environmental issues in Oman. This curriculum was there until the academic year 2004–2005. I remember it was specialised in this issue. This book was addressing environmental problems and their solutions. This curriculum was cancelled after presenting another academic system with regard to the Unified Admission System.”

Three students from school B had similar views on environmental education. The first student from school B stated that: “Environmental education is the science taken from different sources that tackle the environment matters and all the relevant matters.”

The second student from the same school offered ethical awareness of environmental education. She replied, “It is the education and culture related to the environment and the extent of awareness about this matter.”

The third student stated: “We are here in Oman, enjoying a great deal of environmental awareness. There are some school subjects that tackle this issue and the issues of environment protection and environmental problems.”

6.6.2 Awareness about Environment

Some of the students and heads of schools viewed environmental education as raising awareness about the environment. Head of school D stated that environmental education means “the spread of environmental awareness and educative brochures in the school. We do distribute brochures that raise awareness amongst the students and families. The school plays an important role in this matter. The school gives informative bulletins, videos, and instructions to implant this within the students.”

A student's views from the same school were aligned with the head of school. She stated that “environmental education is the science that gives us awareness and keeps the cleanness of the environment. This will help us from diseases and pollution. It also deals with the environment and its problem.”

6.6.3 Natural environment

Some students showed very superficial awareness with regard to environmental education. When a student from school D replied “In general, it is related to everything about the environment. It is also related to natural landscapes. I think it is related to the definition of the environment and the factors that affect it.” Another student from the same school replied, “It is related to the natural phenomena, nature in general such as the sun and trees. For example, it has things to do with the planets and the sun.”

This group of respondents seems to have a very shallow understanding of environmental education. It seems like they are mixing environmental education with the human inductive ability and how to comprehend environmental value through self-observation. It is mostly linked to their social values and morals, which are acquired through social interactions.

6.6.4 Environmental problems

A student from school B viewed environmental education as environmental problems. She stated “There are issues about the environment culture. It deals with environmental issues, problems, and the solutions to such problems and how we can contribute to the environment protection.”

A student from school C replied, “It is the learning of the environment and issues related to it and the protection of the environment. I think it is everything related to our environmental issues, forest, oceans, deserts ...etc.”

Another student from the same school replied, “Really, I don't know. I think it deals with the cleanness and the removal of the garbage and throwing them in the waste bins. I know about one problem such as greenhouse gases.”

6.7 Factors Influencing Students’ Self-reported Environmental Attitudes and Behaviours

To be able to identify the school factors that impact the student’s self-reported environmental behaviours and attitudes it is essential to consider some of the areas of the topic that could be factors. During the interviews with students and teachers, participants discussed main factors at schools that helped in changing students' environmental attitudes and behaviours. Most of the participants, if not all, had no doubt that the curricula at schools play a crucial role in influencing students’ environmental attitudes and behaviours. They discussed the function of education related to the environment that is used to encourage positive behaviours and attitudes of the students, which can be applied in their day-to-day life choices. All participants acknowledged the importance of an environmental education curriculum in schools as a subject.

This could be proved when a student from grade 12 stated, “Sure, this is related to my behaviour towards the environment. This will help me change my attitude towards environmental issues.”

Another student from the same grade said, “Yes, about the use of the curricula that help in increasing awareness about the protection of the environment. This is good because it is reflected in our health in the future.”

A teacher from school A was asked the same question. She answered, “Of course, I agree. This is related to our academic input into the students’ minds because this creates the students’ attitude towards the environment. This will surely result in the good output about their behaviours towards the environment.”

See Table 6.4 for the main categories and examples of coded answers from the course of interviews about the topic of the role of environmental curriculum in schools in changing individuals’ environmental attitudes and behaviours.

Teachers' views on the role of environmental education?	
T1 A	It is essential because we live inside this environment so that if this environment is healthy and free of pollutants, that means we live a comfortable life. Every student should be qualified to be able to protect the environment. They will have their positive participation in society when they finish their academic study. They also can join communities and clubs that arrange activities for protecting the environment.
T2 A	This is a good idea. It deals with the establishment of the environment protection concept. This helps us to live in healthy and safe places. Many diseases come mainly because of pollutions. I think we need to establish such concepts particularly in the grades from 8 to 11. Because the students in grade 12 need to concentrate more on their academic studies. This will help in solving many problems regarding the environment.
T3 B	Sure, because it is very important, particularly for the students. This will help in creating a generation which is aware of the environmental problems that would help to mitigate such problems.

T4 B	Yes, this is good for giving student knowledge about the significance of protecting the environment and resources. This will help our nation so that we can help in the development of our country.
T5 C	Yes, it is good to make it a school subject. This will help to solve the various environmental problems that we face in our country. This will help to put an end to many bad behaviours, particularly those who are dealing directly with the environment. This will help to raise an educative generation.
T6 C	As I told you. Environmental awareness is very important to solve environmental problems. Yes, I agree to make it a separate subject. This will help us to be more effective in dealing with the environment. This will help to change the behaviours.
T 7 D	We should use environmental education as a curriculum. It will be good to get knowledge about environmental issues that we don't know about them. It is good to give the students new ideas about things they didn't hear about before. This will be helpful to tackle any environmental problems in the future.
T 8 D	I support this too much. It is good to teach the students how to deal with the environment. It is beneficial to give them knowledge about environmental issues and problems.

Table 6.4: The main categories and examples of coded answers from the course of interviews issuing the topic of the role of environmental curriculum in schools

It was important to discuss with the teachers the subject of environmental education that they teach at Omani schools. This helped the researcher to have a general image of the environmental topics areas that are discussed in the environmental curriculum in schools. Therefore, the researcher asked the participants about the topic areas that they taught in environmental education classes. They mentioned that the environmental topics are integrated with different subjects, such as science, geography, and social studies. Also, some teachers stated that there is no separate environmental curriculum in Omani schools. Moreover, teachers have provided some examples of these topics; see table 6.5 for some examples of the environmental topics.

However, a teacher from school C argued that the current topics are not enough for students; she stated, “Yes, but it is not enough. Environmental education is very weak. For example, it links the academic subject with environmental issues. It also tackles some problems about the population and its relation to an impact on the environment.”

Another teacher from school D, who teaches geography, also stated a similar point of view: “Yes, it supports it but not much. For me, in geography, the subject supports the environment. In some other subjects, the view could be another thing. The curriculum does not give full information and knowledge about this subject. It only gives brief information.”

T 1 A	The curricula contain some lessons about the environment, nature protection, and sustainability. For example, the book "This Is My Home Country." The book gives an environment map that shows some problems that Oman suffers from, including desertification and the soil salinity.
T 2 A	This is done throughout some school subjects. Today our books have full units tackling the matter of environment protection and problems. For examples, the subject tackles the matters for the environment in general, pollution and the management of pollutants, types of pollutants, garbage, and how to get rid of them.
T 3 B	Yes, in some subjects there are some texts about the environment. We have in the English language some units that give information about the environment and the natural disasters and some other problems.
T 4 B	Yes, the school subjects talk about the diversity and protection of the environment. It also gives knowledge about His Majesty Sultan Qaboos reward about the environment protection.
T 5 C	Yes, but it depends on the type of school subject. Some subjects give information about environmental problems and how to try to solve them – for example, the Ozone problem. We should try to help the students to know the causes of this problem and how to solve it. We should try to cast light upon the student's role to mitigate the environmental problems. We can give an example to the students about the AC sets and vehicles. The students have to focus on these issues within the existing school subjects.

T 6 C	Yes, but it is not enough. Environmental education is very weak. For example, it links the academic subject with environmental issues. It also tackles some problems about the population and its relation to an impact on the environment.
T 7 D	Yes, it supports it but not much. For me, in geography, the subject supports the environment. In some other subjects, the view could be other things. The curriculum doesn't give full information and knowledge about this subject. It only gives brief information. Most of the information are superficial and repeated, such as the issue of the natural reserves, which is a repeated issue in all the academic subjects. We lack the practical activities and field trips on this subject. We depend on the student's experience with this regard. We sometimes use visual presentations.
Te 8 D	Not much. It supports this by only 10%, which is not enough. The percentage is very low.

Table 6.5: Some examples of the environmental topics among the secondary schools' subjects

Furthermore, there were some crucial factors that teachers discussed, which they thought influenced an individual's environmental attitudes and behaviours. These factors are family, schools, community, lack of environmental curriculum in schools, media, and starting to educate young students at early ages in schools about environmental topics. Teachers agreed to the key role that parents play in educating their children about environmental topics. A teacher from school B stated that "The family is influential in this matter. Parents should play their role in this matter." Two teachers from school D believed in the effectiveness of teaching environmental education to young elementary pupils. They discussed the importance and the effectiveness of this element in raising children's awareness, which in turn helps in shaping their behaviours toward the environment. This also results in having a generation with high respect for the environment through their careful daily lifestyle choices. See Table 6.6 for teacher's views of the major causes of environmentally unfriendly behaviours.

Teachers' views of the major causes of environmentally unfriendly behaviours	
T 1 A	Students are different from each other. Some of them do not like to be disciplined so that they need interactive activities. The non-awareness of environmental problems also plays a role in this matter. Some media do not have enough coverage of such problems and the issues related to the environment. We suffer from a lack of external activities that deal with all the senses of the students so that we need more application in the external world.
T 6 C	Not very much. I think the environment that surrounds the students is more influential. The community also affects the students' awareness about this matter. The family is influential in this matter. Parents should play their role in this matter. The school also affects the behaviours of the students . The academic subject is only a part of this, but the surrounding community is more influential on the students.
T 2 A	Yes, I think this is true. Of course, our curricula give good information about this matter, but it is not enough. The curricula should cover this matter from all aspects. This also needs more practical work. It also depends mainly on self-discipline.
T 3 B	Yes, sure, there is a lack of curricula . This matter is not given enough care. This doesn't give the student enough knowledge about these issues.

T8 D	Yes, sure this plays a role in the bad behaviour of the students. I think we have to put a curriculum that preserves the environment. For the curriculum given to the younger students , it gives good knowledge about the environment. But for the older students, there is a lack of this issue because they give more focus on the academic subjects. They concentrate on the final examination and the final score.
T 4 B	I think the subject “This Is My Home” is enough. But we need to give more knowledge to the younger students who do not study this subject.
T 5 C	If you want to implant a concept, you should start with the younger students . We should try to spread this concept amongst the students while they are still young. We should work on encouraging them to take part in environmental activities. This is good to make them aware of the environmental issues. Sure, there is a lack of school subjects that tackle environmental issues.

Table 6.6: Teacher’s views of the major causes of environmentally unfriendly behaviours

Regarding the discussion about introducing a separate environmental education subject at Omani schools, most of the participants insisted on the key role that this would play in strengthening students' knowledge, which in turn builds up their awareness about the environmental topics. Most of the teachers who participated in the research interviews have shown a strong agreement in introducing a separate environmental subject at Omani schools. This obviously can be proved when a teacher has stated "Yes, I strongly support this. This will be good for raising awareness. I wish this will exist soon."

However, two teachers did not agree with introducing a separate environmental subject by stating, "I don't support this. This will add more pressure on the teachers. It is acceptable, but for me, I do not know about how to teach it." The researcher of this study has categories of participants' answers regarding this issue. See Table 6.7 for the main teachers' perceptions of introducing a separate environmental subject at Omani schools.

Teachers who support introducing separate environmental education subjects	
T 1 A	<p>I expect this could make a big difference whether we present it as a separate subject or in connection with another subject. But I see that the way of presenting the subject is more important than making it a separate or non-separate subject. We should not depend on theory in our learning method. I will support to make it a separate subject, particularly if it is taught in an advanced method. This will be reflected in our future generations. This will help to create environmental awareness amongst the whole society. It will be a good idea to spread the knowledge about the environment outside the school and to establish an understanding of the environmental protection. The school is the starting point for this matter so that the whole society will adopt the same ideas. I think the students prefer practical activities more than the theoretical ones. Research has shown that the students interact better with practical activities and interactive learning. When we used advanced learning methods, we found out that the students like the subject more and become more interactive with the subject. This is better for understanding the significance of the subject rather than the theoretical studies.</p>
T 3 B	<p>Yes, I strongly support this. This will be good for raising awareness. I wish this will exist soon.</p>
T 5 C	<p>As I told you. Yes, I agree to make it a separate subject. This will help to tackle environmental problems. This will help to create a generation who cares about the environment. A generation who is educative about these issues.</p>

T 8 D	Yes, I'd like to make it a separate subject. This will give more focus on environmental issues. I'd like to make it a separate curriculum even without the final score. We can use this subject to assess the student's behaviour. We have to make the students enjoy studying this subject.
Teachers who oppose introducing a separate environmental education subject	
Te 2 A	I don't think so. We can link it with other subjects by adding some units that tackle such an issue. This will be good if there are specialities in higher education in colleges because the students usually give more importance to this matter if they know that this will benefit their university graduation. This will play a good role in the elevation of awareness about environmental issues. This should be done with more practical work because it will be more effective in our environment.
T 6 C	I don't support this. This will add more pressure on the teachers. It is acceptable, but for me, I do not know about how to teach it. This also depends on the community. Communities are different from each other. It could be good for one community but not good in other communities. We already tackle these issues as a part of other school subjects, not as a separate subject.

T 4 B	This is not a condition. This matter is related to several academic subjects such as science and other subjects. It is good if we make it as an educative subject, not as a major subject for the final examinations.
T 7 D	It is already there. Now we have the subject of “This Is My Home”. This is a good subject that focuses on the Omani history, geography, and projects, but it doesn't give enough concentration on the Omani environment. It didn't give specific concentration on the Omani nature. We need to focus on this subject rather than repeating the same issues in the school subjects.

Table 6.7: Teachers’ perceptions about introducing a separate environmental education subject in Omani schools

Moreover, participants acknowledged that environmental knowledge is a very important element that can influence the attitudes and behaviours related to the environment. Much of the importance of the element is to do with the role of knowledge in raising a person's awareness, which in turn can strengthen a person's attitudes, resulting in their behaviours. Therefore, it was important to evaluate the heads of the schools' environmental knowledge by discussing with them some topic areas about the environment. This also helped to identify some possible reasons for the low level of students' knowledge of environmental issues. None of the four heads of schools provided correct answers regarding some important environmental events. Even though these environmental events are taking places annually at Omani schools, such as Omani Environmental Day and Global Environmental Day, heads of schools A and B could not provide an answer to these question and they kept silent. Head of school C said, "I don't know" and head of school D said, "I know about it, but I don't know the exact day."

Students' environmental knowledge was also checked through some discussions to explore and understand their awareness about some environmental problems. Most of the students proved some awareness about environmental issues within the country and around the world. They provided some examples, such as desertification, greenhouse gases and climate change, ozone depletion, and forest fires. In this situation, three of the students displayed awareness of environmental issues. However, the anomaly was such that the students from schools C and D indicated that they were not aware of the environmental problems. In another interview, a student from school C replied, "No. sometimes I see natural disasters such as floods and hurricanes. I don't think that man is the cause of this. Earthquake is not caused by man. They are all related to natural factors. Yes, sometimes a man can cause problems for the environments." Table 6.8 shows the main categories found during the discussions about participants' environmental knowledge.

Participants	Main categories	Sample of coded texts
S12, S10 S9	Lack of awareness (No)	No, I don't know. No. sometimes I see natural disasters such as floods and hurricanes . I don't think that man is the cause of this. Earthquake is not caused by man. They are all related to natural factors . Yes, sometimes made can cause problems for the environment.
S1, S3, S5, S7, S8 S11, S6, S7 S2 S3. S4 S13	Yes	Yes, I know about the Ozone, desertification, and fire of forests . Desertification is widely spread here in Oman I knew about “ greenhouse gases ” and “ climate change ”. We should preserve the environment as this will protect the lives of animals even in the North Pole. I knew about the ozone depletion and the forest fires . Here in Oman, we suffer from the pollution that causes harm to the turtles and cause them to die because of the harmful materials. China, for example, there is a lot of pollution . This causes people to suffer from diseases. Yes, they are widely spread, including desertification that is existed in our country and Africa. I knew there are agreements about solving this problem.

Participants	Main categories	Sample of coded texts
		<p>Yes, pollution, for example, air pollution. In India, there is too much pollution. The Ozone depletion. The problem was mainly because of pollution.</p> <p>I knew about the Ozone depletion and the forest fires. Here in Oman, we suffer from the pollution that caused harm to the turtles and cause them died because of the harmful materials. China, for example, there is a lot of pollution. This causes people to suffer from diseases.</p>

Table 6.8: Do you know about environmental problems? Give examples

Also, students discussed the reasons that induced very limited knowledge regarding the environmental crisis. This helped the researcher gain a very serious and deep understanding of the possible reasons that affect their environmental knowledge. Participants debated the functions of some factors in affecting their environmental knowledge such as lack of “environmental education” in schools, lack of subject teachers about environmental topics, sources of environmental information and lack of family role in educating their children about environmental issues. Table 6.9 shows the main categories of respondents’ discussion about the reason for the low level of Omani students’ environmental knowledge.

Main categories	Participants	Samples of coded texts
Environmental education	Teacher 1 school A	Not enough education about environmental topics / no separate curriculum about environmental topics in Omani schools. No practical or interactive environmental education.
Environmental awareness	Teacher 6 school C	Lack of awareness about environmental topics
Environmental carelessness	Teacher 5 school C	carelessness and lack of care given to environmental issues in schools
Teachers qualification	Teacher 8 school D	Teachers who are not educated enough about environmental topics or issues
Family role	Teacher 3 school B	Lack of family role in educating their kids
Environmental sources of information		Lack of sources of information about environmental issues
Religious knowledge	Teacher 2 school A	Lack of religious knowledge which encourages us to protect the environment.
Local community	Teacher 2 school A	The local community didn't do enough to establish environmental concepts within the students
Lack of media about environmental topics	Teacher 4 school B	The media also should give more focus on this matter.

Table 6.9: Reason of low level of Omani student environmental knowledge

The course of interviews with heads of schools mostly reflected their role in managing the schools through designing schools' mission. The researcher of this study discussed with

heads of schools the significant role of the school's mission in introducing new educational concepts to students, which can help in changing students' behaviours. Also, it reflected their understanding of environmental education and evaluated their environmental knowledge. The four heads of schools provided their school's mission and explained how they action the school's mission through some school activities during the academic year. The teachers and students were also asked if they were able to provide their school's mission. Most of them replied to this issue. Their answers were compared those of the with heads of schools to see if there was any material discrepancy between the participants' answers.

Head of school A stated that his school's mission is: "The school seeks to raise the level of awareness and to bring up the good citizen who can build up the future." Two teachers from school A stated similar content, which aligned with their head of school. This indicates that the teachers are aware of their school's mission. However, for school A, students were, unintentionally, not asked their opinions regarding their school's mission.

Head of school B reported that his school's mission is "to bring up citizens educated, aware, that can use modern technology and well behaved that can cope with modern life." It is not surprising that the participant named as "teacher 1" and the students of school B described the same content of school's mission that their head of school had stated. This can be seen when teacher 1 from school B stated that school mission is "the creation of an educative generation that is aware and can work for the environment protection". It is clear both definitions provided by the head of school B and the teacher 1 from school B focused on educating students to be aware of their environment and be capable of behaving well within the challenges of the modern life.

Regarding school C's mission, it is perhaps surprising that there is some difference between the head of school's definition and the teachers' definition from the same school. The head of school stated that the school mission is "focused on the theory of learning and teaching.

This aims at creating integrated educative knowledge inside the students.” In contrast, teacher 1 has stated that the school mission is “the creation of a safe environment to the students” and teacher 2 reported that the school mission is “the school works on giving guidance, making a good relationship between the school and the community. It works on raising environmental awareness.” However, the three students from school C reported similar content of their school’s mission to that of their head of school.

In the case of school D, there is a big difference between all the interviewees. The head of school’s statement was, “the development of a generation that can take part in the country development and good ethics”. Teacher 2 stated that the school mission is: “Our school is a joint responsibility.” The two missions focus on different aspects. Also, the three students reported different school’s missions, which were not related to what their head of school said. Student 1 stated, “Yes, it works for the creation of an academic environment. I see that the school is doing more to make the school environment better for the students and make it more attractive to them. I see a lot of development in the school work to make it more attractive.” Student 2 stated that the school mission is: “focused about the education and the protection of the public property”. However, student 3 reported that “I think there is no specific mission. Sometimes the school concentrates on human perspectives.

However, some teachers showed that they were not aware of their school’s mission. This can be proved when a teacher from school B stated: “I don't know about it. I have not accessed it before.” Similarly, a teacher from school D replied, “Frankly, I am new in this school. Exactly I don't know the mission.”

	School A	School B	School C	School D
<u>Heads of schools</u>	The school seeks to raise the level of awareness and to bring up a good citizen who can build up the future.	To bring up citizens educated aware that can use modern technology and well behaved that can cope with modern life.	The mission is focused on the theory of learning and teaching. This aims at creating integrated educative knowledge inside the students.	The development of a generation that can take part in a country's development, and good ethics.
<u>Teacher 1</u>	Our mission is to create and build up a generation which is aware, educative, and active who can serve our nation. There is no specific goal about the environment in our mission, but creating an educative student would make him aware of the issues and problems about the	Our school is the creation of an educative generation that is aware and can work for environment protection.	The creation of a safe environment for the students.	Frankly, I am new at this school. Exactly I don't know the mission.

	School A	School B	School C	School D
	environment. There is a general term related to the preservation of the school environment in general.			
<u>Teacher 2</u>	Our school usually gives guidance about the protection of the environment. We also address our mission that incites the students to protect the country's public interests, property, and private property. Our mission also guides the students for the cleanness of the environment. We arranged some	I don't know about it. I have not accessed it before.	The school works on giving guidance, making a good relationship between the school and the community. It works on raising environmental awareness.	Our school is a joint responsibility.

	School A	School B	School C	School D
	trips that encourage them to understand this issue better. We take them to some sites where they can do planting and cleaning activities. We make cleaning campaigns on beaches which are organised by specialised societies and clubs. But this matter is not done by the local community within the villages and the neighbourhoods.			
<u>Student</u> <u>1</u>	not available	The school usually incites us to protect the environment. They encourage us to behave well and	Awareness and make us educative. I think it puts the education first and spread of	Yes, it works for the creation of an academic environment. I see that the school is doing more to

	School A	School B	School C	School D
		save the environment, nature, and cleanness. The school mission is the education that implants the love to environment and nation.	knowledge amongst the students.	make the school environment better for the students and make it more attractive to them. I see a lot of development in the school work to make it more attractive.
<u>Student 2</u>	not available	Protection of the environment and encourage creativity, and the attempt to change the world.	First, the school focuses on education. The ministry also concentrates on education and bringing up a good generation.	Fist the school mission is focused on the education and the protection of the public property.
<u>Student 3</u>	not available	The mission supports and cares about the environment. Family comes in the first place then comes the education that encourages us to pay attention to the environment. I	First, it works for educating the students, provides them with knowledge and good ethics. It also gives us information about religion.	I think there is no specific mission. Sometimes the school concentrates on human perspectives.

	School A	School B	School C	School D
		don't know the specific mission of the school.	Yes, sure the school mission has something about the environment and the protection of it.	
<u>Student</u> <u>4</u>	not available	Our school mission is the cooperation with the social community and works for creating an advanced educational environment and a generation that can cope with modern development.		

Table 6.10: All participants' definitions of their school's mission

As a result of the participants' reflections, the main themes emerged, which have been defined as school factors. This category covers specific sub-themes that were present across multiple platforms in the process of interviews. These sub-themes are named as: (1) environmental education factor, (2) environmental knowledge factor, and (3) school mission factor. These are the main themes to be discussed in the following in the rest of this chapter.

6.8 Students' Self-Reported Environmental Attitudes and Behaviours.

This section presents the process of categorising participants' answers regarding environmentally friendly behaviours. During the interviews with students, their environmental attitudes and behaviours in their day to day lives were discussed. This included their behaviours within the schools and outside the schools. They reported the reasons why they behaved in the way they did. Moreover, they stated some factors that they believed influenced their lifestyle choices regarding environmental conservation.

Most of the participants reported positive environmental behaviours and very few reported some negative behaviours towards the environment. The overall image of Omani students' environmental behaviours is that they were friendly to the environment. They reported positive pro-environmental behaviours. Also, they have shown they were concerned about the environment through their daily lifestyle choices. The most common factors that were shared among most of the participants regarding what influenced or affected their day-to-day decision-making were their concerns to protect the environment, financial issues and health concerns. Participants reported environmentally friendly behaviours including recycling, reusing jars and bags, taking part in environmental protection activities, carpooling with others, using public buses, walking to school and turning off lights and air conditioners when leaving rooms. See appendix N for the process of categorising students self-reported environmental attitudes and behaviours.

Participants stated that the first reason why they behave pro-environmentally was that they were concerned about the environment or to protect the environment they were living in. Moreover, they have shown a good awareness regarding the effects of negative behaviours on the environment. Therefore, this showed their willingness to protect the environment through their daily life choices. Some of them demonstrated some good actions that they were doing to protect the environment from pollution. One student had been collecting plastic bottles and sending them to a recycling company for more than two years. During the interviews, while discussing the topic of recycling and reusing objects, a student from school A stated that “I put the items in the recycling boxes. This is good for our environment as it protects it and prevents diseases and insects”. Other student replied, “Of course, it is good for decreasing the volume of garbage so that it protects our environment.”

The second reason that the participants reported to explain their pro-environmental behaviours was financial issues. Participants showed more intention to behave pro-environmentally when their actions or behaviours saved some money. For example, in relation to switching off the light when leaving the room, they explained that the first reason was to save money that is paid to the electricity company. Two students from school A stated, “this saves money”, whereas, other students reported saving electricity.

Health concerns were the third reason that participants reported for their environmental behaviours. Most of the participants have shown good awareness on the benefits of pro-environmental behaviours to their health. They acknowledged that behaving well to the environment, especially their surroundings, is crucial to their health. They believed that living in a clean environment would protect their health from diseases. A student from school B stated that “for individuals, it is important for protecting our health”. Also, another student from the same school reported that “because we live inside this environment. If this environment is good, that means our life will be good. If the environment is bad, our life will be bad.”

Furthermore, a student from school A explained the benefit of behaving pro-environmentally is that “it also protects us from pollution. This is also reflected in the health of man.” See appendix O for the positive reasons for the interviewee's pro-environmental behaviours.

However, as stated earlier, some participants reported reasons why they did not behave pro-environmentally. They did not show any concern to the environment through their daily life choices, such as recycling, using public buses, re-using bags and jars, participating in environmental activities, or buying organic food. The most common factors shared among those participants were lack of awareness, lack of environmental societies’ promotions, lack of availability of recycling boxes, poor quality of bus services. Those participants reported some important aspects of the environment in Oman. They stated that the reason that affected their motivation to behave pro-environmentally was that the environment in Oman was not well planned. For example, the recycling bins were not available everywhere, and the bus services were not well planned to be used in every point near to the residential areas. Students 1,6,7 and 13 stated a similar point of view concerning the bus services’ quality in Oman, that “This also could be attributed to the far places of the bus stops. It is generally used by expatriates. I used it outside Oman in the USA. Most of my transportations were done by bus. In Oman, you have to walk a long distance to reach the bus stop. It is good to use the bus, but the problem is unavailability in all the areas. It should cover all the residential areas.” Another student from school 1 reported that “Sometimes I use public transportation, but this rarely happens because I have to walk a long distance to reach the bus. It is not available everywhere.”

Moreover, some students from the school reported different reasons behind their lack of concern towards the environment. One reason was reported by two students from school A and a student from school D, which argued about the presence of environmental societies in the Omani environment. They have reported that “I don't know about the societies that work on protecting the environment” (student 1, school A). “I don't know an organisation that helps

us to do this” (student 2, school A). “This could be a result of the non-existence or unavailability of the specialised organisations” (student 13, school D). In fact, environmental societies do exist in Oman, but the problem is the lack of awareness about them due to a lack of advertisements in the Omani media or at Omani schools.

In addition to the reasons mentioned above, a student from school A added a third reason related to the health of humans by re-using bags or jars. She stated that “No, I don't recommend the re-use, because this could be unhealthy.” This shows that the majority of the students were not unaware of the environmentally friendly attitudes, including the recycling of waste such as plastic bags and glass, and buying organic food. This was proved when three students from different schools said: “I don't know really what organic food is” (schools A, C, and D). Additionally, two students from school A stated, “Sorry I don't understand what organic food is” (student 2, school A). “I am not concerned about this matter. This is attributed to the lack of it in our area or the lack of awareness about the benefits” (student 3, school A). See appendix P for negative reasons for the interviewees’ environmentally unfriendly behaviours.

6.9 Chapter Summary

Chapter 6 incorporated an in-depth qualitative analysis that was used for the current study. The qualitative analysis was performed using Nvivo software. The study was conducted using 25 interviews with students, teachers and the heads of the school. The responses obtained from these individuals were then run coded through Nvivo software which was able to provide the significant themes. The upcoming chapter will use the results of this chapter and will provide discussion and interpretation of the results.

CHAPTER 7: DISCUSSION

7.1 Chapter Overview

This chapter provides an explanation and incorporation of the important findings that were discussed in detail in the preceding two chapters. This chapter first discusses the theme of self-reported environmental attitudes and behaviours. Secondly, it outlines the main themes related to the factors that influence students' environmental attitudes and behaviours. These themes consist of designated sub-themes that were extracted with the help of the interviews and the surveys. The sub-themes have been called: (1) environmental education factor; (2) environmental knowledge factor; and (3) school mission factor. Also, it will discuss the issue of gender, age, and educational level on environmental attitudes and behaviours. It also provides the authorities' bodies some effective actions and recommendations for a developing curriculum with regard to environmental knowledge and attitudes.

The secondary sources and relevant research identified that environmental sustainability is the fundamental concern for international regulatory bodies (Lu et al., 2016; Hermans and Korhonen, 2017). This can be seen in that one chief aim of the Sultanate of Oman is to improve the living conditions in slums and to provide safe environments to individuals. Other environmental protection concerns are air pollution and waste management. Fulfilling the research aim, the survey questionnaire explored the attitudes and behaviours of students towards environmental issues. This questionnaire included numerous questions relating to environmental protection. To explore the actions of participants for environmental protection the survey included questions relating to pro-environmental behaviours in regular life (see Appendix J). The pro-environmental behaviour includes recycling and re-use of items, saving of electricity, waste management, using vehicles that spread less pollution and purchasing environmentally friendly products. To explore the attitude of participants regarding the importance of environmental protection, the survey asked the participants about the

incorporation of environmental education within the school's syllabus or curriculum. According to the frequencies and descriptive results, most of the research participants agreed that environmental education should be included in schools. Moreover, the significant knowledge of the participants regarding environmental hazards supported the statement that they were aware of the goals of sustainable environment.

7.2 Self-Reported Environmental Attitudes and Behaviours

The study revealed that the students' self-reported attitudes and behaviours, which are directed towards the environment to some extent, depended on gender (see appendix L) . The socialisation and cultural pattern in Oman has nurtured male towards environmental protection. Gender-specific attitudes towards the environment have been recorded in Oman. Female gender recorded a low concern of the environment in Oman. Through the finding, the girl gender under the cultural and the societal role contributed greatly to this result. The cultural inclination in Omani society has been to propagate the hierarchical roles that give men a higher status than women, which has led to the ignorance of female students on concerns of the environment. Oman is a Muslim-dominated country, and places the male gender on a higher scale. Domination over women is rampant and posits a treatment of women and the environment from a superior position. Where male dominance is practised, females find themselves inferior to males. This has contributed to their ignorance of the environmental information based on a perception that pursuit of knowledge about the environment may amount to an attempt to sabotage the superiority of the male gender. Oman, as a Muslim country, has seen men assume major roles relating to environmental concerns. The paths taken by the male gender in the society of Oman has given the male student a greater concern in pursuit of the environmental issues. Findings in Oman shows that boys participate a lot in environmental issues compared to girls. This is due to the social engagement of male gender

in the culture and society of Oman. However, the teachers' responses on the environmental attitudes revealed that if the girl students are well motivated and encouraged to participate in environmental protection that will, in a dynamic way, give favourable environmental attitudes.

As per the general conception that is being followed in the male dominant society. This has been seen that these societies have the general conception where any of the duties that have physical aspects involved. Hence the environmental activities that are involved will be male-dominated, compared to the female members that are more enthusiastic towards this approach. It is important to note that environmental awareness is common regardless of the gender. The current study was conducted by a female researcher, hence there being many females who were willing to participate in the study. The results obtained were able to depict the environmental knowledge within the female population of Oman.

The findings explain that a significant number of students who were in the older age range appeared more likely to participate in environmental issues and considered the importance of natural resources of the country (see appendix L). The older students had a larger span of experience with the environment, attributed to their age (see appendix L). Thus they understood a lot of issues relating to the environment. Moreover, another aspect of age which was involved in the study is the level of education. The findings showed that most of the students who had a higher level of knowledge of environmental aspects had more pro-environmental behaviours. This phenomenon is explained by the fact that as students move to a higher level of education the scope of knowledge and information on environmental issues is increased (see appendix L) . This complies with the theory of responsible environmental behaviour (REB). The model explains that increasing knowledge results in more positive environmental attitudes. This will, in turn, develop a healthier attitude towards the conservation of the environment. Additionally, through creating awareness, an environmental ethic is

developed, which creates an intrinsic motivation for conserving energy and reducing the impact on the environment, activities which relate to REB.

The study was also able to depict the need and urgency that is present within the individual regarding environmental aspects. From the findings, it can be seen that the majority of the participants were willing to make necessary alterations in their lifestyle to incorporate environmentally friendly attitudes (see appendix K). One of the most common aspects of this was the fact that the majority of students, irrespective of gender, were willing to spend extra on environmentally friendly products (see table 5.12). These are products that are manufactured in a more environmental friendly manner, or with ingredients or packaging that are sustainable. Such measures often cause the products to cost more. It can be seen that majority of the students expressed interest in spending a larger sum of money for the sake of the environment.

The study revealed that students from higher grades had more information about the environment than those from the lower level (see appendix L). Further, this study showed that access to different sources of environmental information, such as television, online forums or social media, books, environmental education subjects, and school, has greatly contributed to perceptions of the environment. Since all the students were from the urban areas, they were often able to get in touch with the environmental issues being discussed. However, students from lower grades possessed a high level of responsible environmental attitudes (see appendix L). This is attributed to the fact that they had many more opportunities to access sources of environmental information. The feedback collected revealed that students from the urban environment had the opportunity to engage in activities to conserve the environment, such as tree planting at their schools, and cleaning the beaches. These students were brought up in a situation where communal practices were geared towards environmental conservation and protection. The study revealed the norm activation model theory that argues for prosocial behaviour. The responsibility that is placed on the shoulders of the male child has contributed

a lot in their attitudes and behaviours to the environment. The responsibility works in creating awareness of the significance of the environment. Further, schools that have their core mission in endeavoring to uphold environmental regulation and train their students on the importance of the environment recorded a good response with regards to environmental behaviour.

Moreover, some urban students' behaviours towards the environment have been negative (see table 6.12). This has been attributed to the environment they have been exposed to in an urban setting where there is a huge disposal of rubbish everywhere. Also, rubbish bins are not well enough distributed in all areas of the city. It is clear that this could help to change citizens' behaviours from negative to positive. In addition, the local bus services are not well distributed to cover all the residential areas in the city. This causes difficulty in motivating citizens to use public buses. Moreover, the feedback from the respondents revealed that the hot weather in Oman is discouraged them from walking instead of using cars or buses.

The behaviour of the students holds some significant importance in this regard. It can be seen that the environmental education has been able to provide countless benefits in achieving sustainable behaviour. Sustainable education includes the factors related to the environment and the need to conserve it. This has led to the necessary awareness among the students. This awareness was able to induce the attitudes and behaviours of the student in such a manner that it allowed them to induce the concept of sustainability.

Education is a very important factor that allows individual students to understand environmental adversities. It is important that the students understand the elements of adversity that have been induced by humans. In addition, this factor allows the behaviours and attitudes of the students to be altered based on the relevant information. Hence, adequate knowledge will allow students to be able to reach sustainable goals more quickly, since education is able to produce a new generation that has the much needed awareness of the need to achieve sustainability.

7.3 Factors That Affect Environmental Attitudes and Behaviours

7.3.1 Environmental Education Factor

This study has explored the provision of environmental education in the context of Oman using mixed methods research. Overall, it is clear from this research that, in the Omani context, environmental education is developed as a unit integrated into social studies, science, and citizenship education. Moreover, literature indicated that education is an effective tool to help change the individual's bad behaviours to the environment to more sympathetic ones. Therefore, offering the students specifically designed subjects regarding environmental education will provide them with different opportunities for learning about the environment. Therefore, this might result in broadening considerations of the environment and its related issues. Also, it is expected to increase students' awareness of global issues, which would help to increase personal responsibility in terms of the practices that are environmentally friendly.

In addition, the results attained from the study have shown that environmental education was one of the most important content areas to have been emphasised by social studies teachers in Oman (AL-Mammari et al., 2014; AL-Nofli, 2010). However, compared to other content areas such as history, family life, education, and public issues, environmental education was a less important content area than those mentioned (AL-Mammari et al., 2014). There was a huge diversity in terms of the content of the overall syllabus of the social sciences subject. This course includes information regarding many different elements such as the social sciences, humanities, and other such similar fields (NCSS, 1994). Significant importance has been given to the literature directed towards the country of Oman. This includes the geography, history, and a rich understanding regarding the responsibilities of the citizens of Oman. In the overall scenario, there is a mitigating element that is present for the world culture as well as the education in the global context. However, as per the priority, global education should be given

more importance in terms of social studies. As the NCSSI (1994, p.7) pointed out, students should be helped “to construct a global perspective that includes knowledge, skills, and commitments needed to live wisely in a world that possesses limited resources, and that is characterized by cultural diversity.”

Moreover, this study indicated the potential effectiveness of education. This impacts the overall ideology and the thinking of young children. This is then able to dictate the actions and the future behaviour of the children, which will be friendlier to the environment in many ways. This, in turn, will be very beneficial in inducing a friendly attitude that can tackle the problem of global warming effectively. An example is from Oman, where it is noted that there has been a significantly positive effect from teaching about switching off unused household equipment that has been able to induce many advantages for the environment. The potential “effectiveness of education” for this action is low. It may be that students are receiving positive feedback regarding the actions, and have become more willing to act in the right direction. Providing students with knowledge about global warming as well as other factors, such as nuclear power generation. Inducing such elements will have a lower factor for the children to act, since the nature of the student is to have resistance to act in the environmental aspect. This means that the student overall is very reluctant to act despite having the information regarding the ability of nuclear power generation to contribute negatively to global warming. This in turn, provides deep responsibility to “environmental advocacy” in ensuring that the students have the desired knowledge, in contrast to the concepts of safety related to nuclear power. There is another element that provides reassurance that if students receive the right teaching practices, they can then be induced to behave positively in terms of the environment, for example, planting trees, the decreased use of artificial fertilisers and the ability to encourage recycling have made it possible to induce much positive change on the overall environment.

A change is only possible with the right implications of the importance of education. The right education will be able to induce positive behaviour on the individual student. This makes it very important for the institutions to be able to focus a significant amount of investment in providing education regarding the environment, given the dire need in this regard. It is necessary to address global warming, which requires very profound action. However, the use of the environmental behaviour attitude can be an indicator of the magnitude of the problem that is present (Kaiser et al., 2007). There have been two theories that are working in this regard, one being “the theory of planned behaviour” (Ajzen, 2015), the other theory is the “value-brief-norm theory” (Stern, 2000). Both of these theories are able to provide detailed information regarding actions related to the environment (Kaiser et al., 2005). However, the current study has been a fragmented element of the “models of the behaviour” that is being formulated in this regard. However, this has led to the fact where these models have allowed the students to depict the values and the interest in taking part in actions that can be considered as environmentally friendly. In addition, it has also allowed it to have the designated link which is being created for the incorporation of these particular actions. This has led to suitable environmental advocacy, which has been possible to indicate the link between the suitable environmental topics. However, in the situations where the students are made aware of the effects of their actions on the environment, this has enabled them to adopt such positive actions.

The findings of this research found that the majority of the students without wide knowledge of the importance of environmental education had a negative attitude about the environment, which influenced their choice of action. Education, as the keys of knowledge that helps in unshackling the potential possessed by the young students, helps in training students on environmental matters. This provides a foundation that prepares the students to be advocates of environmental injustices. One of the environmental objectives is to ensure that to a large

extent, environmental problems are reduced. The findings show that, education ensures that students become sensitive about the environment and they grow to become good service men and women by helping develop good attitudes, thoughts, and behaviours that are geared towards the protection and conservation of the environment. The findings imply that the education curriculum needs to be robust enough to cover all the necessary knowledge that trains the student on the importance of the environment. The findings demonstrated that schools in Oman make a huge contribution as reputable learning institutions, however, the feedback collected from the students has shown that there is a necessity to ensure that the teachers are well trained and equipped with enough information on the environment so that they may be able to pass it on to the students.

Based on the findings, environmental education has made a huge contribution to the general environmental consciousness in Oman. The student with better education about the environment has demonstrated an increase in pro-environmental behaviours. Education is crucial in creating awareness in the students about the environmental issues within Oman; hence, enhances good attitudes and behaviours that seek to conserve and protect the environment. This improves the socially desirable response, which travels to a wider population contributing to the overall behaviours and attitudes. All the institutions of learning need to ensure that all their schools are grounded on a good curriculum system. This will train students on the importance of the environment that will not only develop environmental activism but more so develop individual behaviours. The study in Oman also revealed that there is a disconnect between the knowledge taught in class and the human activity that contributes negatively to the environment. Students are taught about water conservation, climate change, pollution, waste management, among other environmental units. This curriculum has taught the student in Oman on the theoretical aspects of the environment that is inclined towards a focus on getting good grades, ignoring the practical aspect of this topic to

the environment and subsequent attitudes and behaviour of the human being. In this respect, this has led to unfavourable attitudes of the students towards the environment.

Similarly, the findings indicate that the majority of the students who have been trained in environmental education possess a positive perception of the environment. Through this perception, the analysis shows that there are good attitudes and pro-environmental engagement that are geared towards the cohesive, sustainable environment. The analysis conducted shows that the student with good perception is willing to engage in practices that are environmentally friendly, such as following a good system of disposing of waste, using biodegradable products and participating in civic education within schools and in the society, advocating for good environmental practices. Further, the findings reveal that the student with knowledge understands the impacts caused by human activity that are contributing to environmental issues, and the need to conserve and protect the environment.

Additionally, research within Oman has shown that information is dependent on belief and attitudes that contribute to one's opinion about the environment. Similarly, the study has proved the responsible environment behaviour theory, which argues that increased knowledge directly translates to a favourable attitude towards the environment. The majority of the students within Oman who were knowledgeable on environmental issues have good attitudes towards the environment. They have been able to appreciate the significant role of human activity toward the environment. Further, the findings revealed that having knowledge about the environment creates environmental awareness. Students within Oman who are aware of environmental issues have demonstrated their motivation of committing themselves in practices that help conserve and protect the environment.

7.3.2 School Mission

From the study conducted in secondary schools in Oman, the findings are that from the majority of the schools, the mission is a determining factor that influences the student's knowledge of the environment and their view of social and environmental problems. Further, schools that have their core mission in endeavoring to uphold environmental regulation and train their students on the environment's importance recorded a good response with regards to environmental behaviour. Moreover, the findings from the study also indicate that the majority of the schools had missions inclined towards the environment and most of the students from these schools had more knowledge on issues pertaining to the environment, compared with those from schools that had no policies towards the environment or their missions did not incorporate environment related subjects. As a result, students from schools with environmental policies had more pro-environmental attitudes and behaviours due to the vast knowledge and information instilled in them towards the importance of conserving the environment compared to those having no environmental policies. Furthermore, the results that have been extracted from the this study depict that the majority of the schools where extracurricular activities linked to the environment are entrenched within their systems do have more interest in the environment compared to schools who do not incorporate such extracurricular activities. This is because the extracurricular activities, like science fairs, drama and acting, offer the students an opportunity to practise and get more involved in the environment.

Additionally, students from schools that have a significant policy in regards to the environment. It is suggested that the environmental policies are required for the students who lack such knowledge. This is because the school mission plays an important role in acquiring information relating to the environment. Moreover, it also influences the students in finding and learning new environmental ideas and concepts. Also, students from schools with

environmental policies choose the school as the source of information. This is because the school with such policies aids students in getting a deep understanding of the possible negative impacts of not conserving the environment. Moreover, they equip them with more information and knowledge relating to the environment and also help in creating positive admiration for the environment.

7.3.3 Environmental Knowledge

From the study conducted, the male students recorded a better percentage in terms of environmental knowledge. The knowledge about the environment is related to the fact that there is a significant amount of social awareness that is present within an Omani national. In addition, it can be seen that for the majority of the Omani students in secondary schools the sources of knowledge are school and the mass media. This is because it is in school, mainly through the teachers educating them on the various aspects of the environment, that the students can acquire knowledge relating to the environment. Furthermore, mass media, especially through television, enable students to get information. This is made possible through the various television adverts and programmes relating to the environment. As a result, how pro-environment or against the environment the source delivers the information to students will determine the attitudes and behaviours of the students towards the environment. For instance, television programmes that are aired to encourage the conservation of the environment will influence the students toward pro-environmental behaviours. Additionally, teachers delivering environmental topics having positive impacts on the environment will automatically encourage the students to pro-environmental attitudes and traits.

Education plays a very important role in the ability of students to perceive the importance and the urgency that is associated with environmental conservation. The students with more knowledge have a better understanding of environmental problems. This fact can be

elaborated on in the following manner. Where there are many aspects that dictate the attitude of the individual, it becomes very important to induce the necessary awareness in the curriculum that is being taught to the students. This means that the designated awareness will be able to provide the necessary encouragement towards the attitude and behaviour of the individual. What education will provide is the attentiveness towards environmental problems. In addition, education will also provide the knowledge in terms of the consequences these factors can have on the environment. This proves the overall importance of education in producing the future citizens of Oman who have the necessary understanding of the environment.

From the study, it can be seen that the results that were obtained depict the trend that most of the schools in the secondary level of Oman are positively impacted by the factors influencing the students' behaviours and attitudes. The factors influence the students to transform to more pro-environmental behaviours. Moreover, from the study, the factors which had a significant role in positively changing the orientation of students in Oman to conserving the environment include the school mission and education curriculum. This is reinforced by the fact that in schools the common activity that students engage in is education. Moreover, it is through education that students acquire knowledge and information, hence, with the incorporation of various environmental aspects, it serves as one of the main influences on the students' attitudes and behaviours.

Based on the detailed description that has been provided, it can be concluded that the theory has been correct, in terms of fulfilling all its dedicated objectives. The main aim was to indicate the importance of education in terms of activating the right type of attitude and behaviour towards environmental conservation. The objective was to depict how positive the attitude can be among the Omani students regarding the environment. Therefore, it can be said that education was to induce the much needed perception and depth among the students. The

right curriculum will allow the students to have the insights and knowledge regarding the consequences of environmental aspects that are left unattended. Hence, it can be confirmed that the theory was successful and that the right education and carefully designed curriculum will be beneficial in ensuring the right attitudes and behaviours among the common population.

7.4 Chapter Summary

This chapter has discussed the findings that have been obtained in the previous chapters. The chapter has provided a very detailed discussion of the findings. The discussion has allowed the accurate interpretation as well as the analysis of the problem. This chapter also described the importance of the attitudes and the behaviours of students in terms of the environment. In addition, the relationship was established between these designated attitudes and the curriculum that is being taught in the institutions. These factors will allow the students to have better understanding regarding the environmental concerns as depicted by the findings in this chapter. The following chapter will then contain the conclusion of this research and provide the necessary recommendations that can be incorporated to allow the necessary improvements in regards to the research questions that were chosen.

CHAPTER 8: CONCLUSION

8.1 Chapter Overview

This chapter summarises this study and discusses the major conclusions in regard to the factors that determine students' self-reported environmental attitudes and behaviours. This study focuses on three major factors that are expected to influence Omani school students' environmental attitudes and behaviours. The first factor is the students' environmental knowledge and whether higher environmental knowledge is associated with more pro-environmental behaviour. The second factor is school environmental education (i.e., the environmental curriculum in Omani secondary schools) and whether environmental education in Oman is appropriate to motivate school students to care for the environment. The last main factor that determines the students' environmental attitudes and behaviours is the school mission.

The remainder of this chapter is written as follows. Section 8.2 will discuss the overall factors for this study and its major content. Section 8.3 discusses, in brief, the major research objectives and the methodology implemented to achieve these research objectives and answer the research questions. Section 8.4 explains the most important findings of this research project and the conclusions that can be drawn out of these findings. 8.6 Section highlights some of the limitations of this study, a number of suggestions by which this study can be upgraded for future research, and the expected policy implications as a result of the research findings.

8.2 Overview of the Study

This research project is divided into eight chapters. Chapter 1 introduced the basic concepts, ideas, terminology, and issues related to the environment. The chapter also discussed environmental attitudes and behaviours and the influences that determine students' pro-environmental attitudes and behaviours. In addition, chapter 1 identified the problem statement for this research and the environmental attitudes and behaviours theoretical framework. In order to help the reader of this research thesis to understand its value, this chapter highlighted the importance and contribution of this study based on the literature gap. Moreover, chapter 1 listed research aims, research questions, and a hypothesised model.

Chapter 2 provided background information about Omani education and how the education system in Oman has evolved over the last 45 years. It also provided some key statistics about schools, students, teachers, and programmes. In addition, in Chapter 2, some information about environmental education in Omani schooling system was illustrated. One important aspect that was discussed in chapter two is in regard to Oman's environmental preservation initiatives. These initiatives show the extent to which the environment is a key element in Oman's national strategies and visions.

Chapter 3 summarised the previous literature relevant to this study and critically analysed the main outcomes of previous studies. The literature review chapter categorised the available literature into different headings in accordance with the overall structure of this study. It illustrated examples of studies that defined environmental education, its main objectives, and its distinctive characteristics. This chapter also defined environmental self-reported attitudes and behaviours, and major factors that influence individuals' attitudes and behaviours towards the environment.

Chapter 4 focused on, the data and research methodology. Chapter 4 described the data set of this research, data collection tools, research theoretical framework, the design of the

research, and the designated instruments. The significant element of this chapter explained the “mixed method” approach, which has been used to investigate these research questions.

Chapter 5 presented quantitative data analysis and results. It analysed the quantitative data using statistical analysis such as descriptive statistics, cross-tabulation, multivariate analysis, and factor analysis. On the other hand, Chapter 6 presented qualitative data analysis and results. In this chapter, interview data was transcribed and analysed. This chapter utilised Computer Assisted Qualitative Data Analysis (CAQDA) to manage and analyse a large amount of qualitative data. In addition, thematic analysis was adapted to identify, analyse, and report patterns within the qualitative data.

Chapter seven outlined the main themes that has been defined as schools’ factors that affect students’ environmental attitudes and behaviours. Also, it discussed the issues that affect students’ environmental attitudes and behaviours based on interviewees' responses. This thesis is summarised in the last chapter; Chapter 8.

8.3 Research Objective and Research Method

The objective of this study is to investigate the different factors that influence Omani schools’ students’ attitudes and behaviours towards the environment. It examines whether students' knowledge about various environmental issues is associated with pro-environmental self-reported attitudes and behaviours. In addition, this study evaluates the impact of an environmental education curriculum in Omani schools on students’ preservative attitudes and behaviours toward the environment. The main contribution of this study is represented in the third objective of this study, which investigates the relationship between schools’ mission and students’ pro-environmental attitudes and behaviours.

This research also aims at identifying other schools’ factors that might influence students’ self-reported environmental attitudes and behaviours within and outside Omani

secondary schools. Moreover, this study attempts to inform curriculum developers within Oman regarding the schools' factors and their role and impact on self-reported environmental behaviours and attitudes.

In regard to identifying the best methodology to achieve the research objectives of this study, the first consideration is given to establishing whether an inductive or deductive approach would be implemented in the research design. Due to the reason that this research seeks to build knowledge and understanding on a social issue, it was also important to establish an epistemological and ontological position in determining a suitable methodology. Thus, this research utilises pragmatism, which implies the deconstructive paradigm which seeks to favour the use of mixed methods in research (Teddlie and Tashakkori, 2003). Pragmatism combines both positivism and interpretivism approaches to develop a research philosophy for a single study (Feilzer, 2010).

This research aims at investigating students' self-reported environmental attitudes and behaviours. It evaluates whether awareness, knowledge, intention, and attitude transform into action or not. For this purpose, the Responsible Environmental Behaviours (REB) theory is used as a research epistemological position. REB explains that knowledge, intentions, and attitude are behavioural dispositions, and these behavioural dispositions are irrelevant to the real world unless they translate into action and reality. Thus, REB implements the general philosophical framework of pragmatism since pragmatism focuses on actions as a means to understand the world.

The research design used to execute this research is based on a mixed method approach which focuses on an explanatory design using sequential phases (quantitative – qualitative). The sequential explanatory research design resonates best with the mixed method of study which includes both qualitative and quantitative analysis. Using both qualitative and

quantitative methods helps to overcome the limitations of each of these approaches and enhance the quality of the analysis (Castro et al., 2010).

The quantitative part of this study involves the use of a questionnaire to collect data from the students. This has formed the basis for better understanding the self-reported attitudes and behaviours of students towards environmental issues. In addition, conducting the survey helps the researcher to get an insight about the impact of school vision and mission, environmental education courses, and environmental knowledge on students' pro-environmental self-reported attitudes and behaviours.

The qualitative part, on the other hand, allows the researcher to probe further on areas of interest, hence collecting more accurate feedback relating to the actual descriptive answers of the respondent. In other words, the interview investigated in more detail why some students behave differently from others, how each factor impacts students' pro-environmental behaviours, and what are the motives that drive students' pro-environmental behaviours other than the ones specified in the survey.

Overall, the implementation of a sequential explanatory mixed methods design makes the study strong and allows for capturing more detail. However, there are still some limitations for this approach such as: it requires plenty of time to be completed and a wide range of resources to collect and analyse both types of data (Castro et al., 2010).

8.4 Main Findings and Conclusion

This section documents the main findings of this study. The analysis part of this thesis, which has been discussed in Chapter 7, resulted in a number of significant findings. These findings are divided into two main parts. The first one is related to the qualitative analysis outcomes. And the second part is related to the quantitative analysis outcomes.

8.4.1 Quantitative Analysis Findings

Environmental education, along with other schools' factors, is expected to influence students' perceptions, attitudes, and behaviour toward the environment and contemporary environmental issues that are facing our planet. In order to understand what the major factors are that determine students' self-reported attitude and behaviour towards the environment, simple descriptive statistical analysis was conducted. The descriptive statistical analysis helps to identify students, teachers, schools, and cultural specific-characteristics, which could incline different attitudes and behaviours toward environmental issues.

The descriptive statistical analysis shows that at least 38.2% of the respondents were the ages of 15 and 16, 50.9% at the ages of 16 and 10.8% between the ages of 17 and 18. This indicates the average age of students in the secondary school levels. Also, due to the sampling method used in the study, it was observed that 68% of the participants included were female.

The analysis indicates that most of the respondents believed that schools are doing enough in promoting environmental sustainability. According to the results (mean=4.58), a larger section considered the schools' missions sufficiently structured to address environmental sustainability. The result (mean=4.16) points out that most students believed that the curriculum in schools within Oman are well or sufficiently designed to support environmental knowledge.

The answers to the question of environmental pollution and degradation indicate that most of the respondents believed that it had a significant impact on them. The results (mean=4.28, SD=1.03) suggest that they believed an increase in pollution and environmental degradation in society will have an effect on the population. In addition, most of the respondents (mean=1.12) indicated a positive outlook toward engaging in pro-environmental activities. This is further illustrated by the willingness to shift attitudes and behaviours towards more supportive pro-environmental initiatives such as conservation or recycling.

The second part of the quantitative analysis is cross-tabulation of some major items of the questionnaire with respondent-specific characteristics such as gender, age, and school name. The results in this section show that in a cross-tabulation between gender and the level of awareness on environmental problems, it was determined that the female gender is less empowered. Also, the findings of the study indicated that schools are doing enough in promoting environmental education. Among the respondents from the different educational levels, 150 argued that the approaches adopted by the schools in delivering environmental education were sufficient in meeting the knowledge needs of students and significant others. In addition, the cross-tabulation analysis between education level and whether the students paid more for environmentally friendly products when there is a cheaper alternative shows that students in grade 10 exhibited stronger behaviours toward preserving the environment compared to grade 11 and 12 students. The result shows that 25% of grade 10 students strongly agree with the above manner compared with 13% for grade 11 and 8% for grade 12. However, if the entire population is considered, the results show that a large section of respondents who were willing to pay more for environmentally friendly products despite the presence of cheap alternatives (41.3%).

The last part of the quantitative analysis chapter is a factor analysis. Factor analysis is used a lot by researchers, especially when they are trying to develop and evaluate tests or scales that measure a particular construct or a particular knowledge area. This typically works as the researcher who is developing the scale starts with a large number of individual items or questions. This helps in minimising the number of factors that influence students' attitudes and behaviours.

The study was conducted among school students from various schools in Muscat Governorate of Sultanate of Oman. The population comprises 4000 students from those schools. The responses of all respondents were subjected to a data cleansing process. In all,

there were complete responses from 159 respondents. The questionnaire prepared was subject to Cronbach's alpha test, which measures the internal consistency of various variables and how closely these variables are related as a group. The Cronbach's alpha score for this study is 0.766, which indicates that the internal consistency of the data collection instrument used is good and that the variables under study are closely related.

Also, Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was conducted, and for the data collected for this research, the value is 0.721 and is considered as "middling", and hence the data comfortably qualifies for factor analysis to be conducted.

The results of factor analysis show that 70.5% of respondents agree that they re-use bags or jars and that the second most important communality is found to be on the variable "I am a big champion of recycling and reuse of waste" with the next highest communality of 67.8%. On the other hand, the two variables with the lowest communalities are "How much would you say you know about water quality?" and "How often do you do buy locally-grown foods on a regular basis?" The communalities for these two variables are 42.2% and 43.6% respectively.

8.4.2 Qualitative Analysis Findings

The process of data analysis and the results of the interviews' data is presented in Chapter 6. The analysis is divided into four sections. Firstly, it presents a detailed process of data transcription. Secondly, it outlines the process of conducting the analysis of the research interviews. Thirdly, it outlines the participants' demographic information. Finally, it presents the results of interviews with the participants.

This study involved qualitative interviews in exploring the participants' perceptions and awareness about environmental education, their environmental attitudes and behaviours, and the factors that influence their environmental attitudes and behaviours. A semi-structured

qualitative interview approach incorporating open-ended and close-ended questions was employed.

Eight teachers, four head of schools and thirteen interviewees were with students from four different schools in Oman. The interviewees' ages ranged from 15 to 18 years old. Most of the interviewees who were students were from grades 11 and 12, and the rest were from grade 10. Heads of school qualifications were bachelor's and master's degrees; two of them with arts specialisations and the other two are from science specialisations. The qualitative data were collected through a number of 25 interviews. A total number of 13 were female, and 12 were male.

The analysis of students' and heads of schools' awareness of environmental education led to sub-categories: (1) curriculum about environment; (2) natural environment; (3) environmental problems; and (4) awareness about the environment.

(1) Curriculum about the environment:

For most of the parts, students and heads of schools had similar awareness about environmental education. Both perceived environmental education to be a school curriculum about the environment.

(2) Awareness about the environment:

Some of the students and heads of schools viewed environmental education as raising awareness about the environment.

(3) Natural environment:

A group of students showed surface-level awareness with regard to environmental education. It seems like they were mixing environmental education with the human inductive ability and how to comprehend environmental values through self-observation. It is mostly linked to their social values and morals, which are acquired through social interactions.

(4) Environmental problems:

A number of students viewed environmental education as environmental problems. For example, one student stated, “There are issues about the environment culture. It deals with environmental issues, problems, and the solutions to such problems and how we can contribute to the environment protection.”

Feedback of interviewees in regard to the schools’ factors that might determine students’ attitudes and behaviours toward the environment shows all reported factors could be classified under three main groups. These three main factors-groups are (1) environmental education factor, (2) environmental knowledge factor, (3) school mission factor.

Most of the participants, if not all, had no doubt that the curricula at school played a key role in influencing students’ environmental attitudes and behaviours. They discussed the function of environmental education in raising students’ knowledge about environmental issues that influence their attitudes and behaviours through their daily life choices.

In regard to the school mission, this study has discussed the significant role of the school’s mission in introducing new educational concepts to students, which can help in changing students’ behaviours. In addition, it reflected their understanding of environmental education and evaluated their environmental knowledge. Respondents have provided their school’s mission and explained how they enact the school’s mission through some school activities during the academic year. The analysis shows that the majority believed that a school’s mission with an environmental element embedded in it contributes to more positive students’ environmental self-reported attitudes and behaviours.

Moreover, participants acknowledged that environmental knowledge is a factor in changing their environmental attitudes and behaviours. Most of them have deliberated on the role of knowledge in raising a person’s awareness, which in turn can strengthen a person’s attitudes resulting in their behaviours. Also, students’ environmental knowledge was explored

through some discussions to understand their environmental awareness about some environmental problems. Most students have proved some awareness of environmental issues within the country and around the world. They provided some examples such as desertification, greenhouse gases and climate change, ozone depletion, and forest fires. However, three students showed a lack of awareness about some environmental issues.

Furthermore, there were some crucial factors that teachers have discussed which they think influence an individual's environmental attitudes and behaviours. These factors are family, schools, community, environmental curriculum in schools, media, and starting to educate young students at early ages in schools about environmental topics.

To conclude, the findings of this research found that the majority of the students without a wide knowledge of the environmental importance have a negative attitude about the environment, which thus influences the choices of their actions. Further, schools that have their core mission in endeavouring to uphold environmental regulation and train their students on the environmental importance recorded a good response with regards to environmental behaviour. Environmental education, as the keys of knowledge that helps in unshackling the potential possessed by the young students, helps in training students on environmental matters.

8.4.3 Integration of Both Data Findings

This study utilized the mixed methods research where both the qualitative and quantitative methods were employed to bolster the accuracy of the findings. Moreover, methodologists have pointed out the essential role played by the integration of qualitative and quantitative data as the epicenter of mixed methods in research (Snelson, 2016). Integration infers the process through which a researcher deliberately merges the qualitative and quantitative approaches in a study, to make the two different approaches to the study interdependent in addressing the research questions and hypotheses laid out for the study (Snelson, 2016). Nonetheless, effective

integration allows the researcher to better enjoy the benefits of adopting the mixed methods in achieving a comprehensive perception of the findings which will prove more meaningful understanding than they would in the separate approaches. This study observed that to achieve effective integration, it would have to adopt suitable study design, methods, interpretation and reporting. The next section highlights the study design and method adopted for the purpose of integrating the quantitative and qualitative data of the current research.

8.4.3.1 Mixed Methods Designs

The elementary mixed methods designs offer guidance on the process of integration. To be precise, they explain the integration of basic methods: explanatory sequential, the exploratory sequential and convergent designs (Subedi, 2016). To begin with, the exploratory sequential design compels the researcher to begin by collecting and analysing of quantitative data; after which the findings are utilized in the determination of the data collection and analysis of qualitative data. On the contrary, the explanatory sequential design, quantitative data is first collected and analysed; a subsequent process of collecting qualitative data is initiated to understand the research problem in a comprehensive manner (Creswell, 2002). Finally, the convergent design, which is also referred to as the concurrent design, encompasses simultaneous collection and analysis of both qualitative and quantitative data, after which the resultant data is subjected to intergradation (Subedi, 2016).

Integration

This study adopted the explanatory sequential design in integrating the two sets of data; the quantitative and qualitative data. Nonetheless, these two sets of data were obtained sequentially from respondents who were heads of schools, teachers and students from the schools in Oman. Considering the research aimed at establishing the impact of environmental education along with other school factors on the perceptions, attitudes and behaviours of students.

This study involved the administration of interviews in understanding the participants' perceptions and awareness about environmental education, their environmental attitudes and behaviours, and the factors that influence their environmental attitudes and behaviours. The study was conducted among school students from various schools in Muscat Governorate of Sultanate of Oman. The population comprises 4000 students from those schools. The responses of all respondents were subjected to a data cleansing process. In all, there were complete responses from 159 respondents. Furthermore, a semi-structured qualitative interview approach incorporating open-ended and close-ended questions were employed. The questionnaire prepared was subject to Cronbach's alpha test, which measures the internal consistency of various variables and how closely these variables are related as a group (Siswato, 2018). The Cronbach's alpha score for this study is 0.766, which indicates that the internal consistency of the data collection instrument used is good and that the variables under study are closely related. Moreover, the respondents were randomly selected using the sampling method, which was subjected to Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was conducted, and for the data collected for this research, the value is 0.721 and is considered as "middling", and hence the data comfortably qualifies for factor analysis to be conducted.

The study covered four schools in Oman where eight teachers, four heads of school and thirteen students were further interviewed. Survey collected from students showed that at least 38.2% of the respondents were at the ages of 15 and 16, 50.9% at the ages of 16 and 10.8% between the ages of 17 and 18 years. Further, the study made an evaluation of the awareness of the students, teachers and heads of schools on the concepts of environmental education. To be precise, the study subdivided the questions to awareness on (1) curriculum about the environment; (2) natural environment; (3) environmental problems; and (4) awareness about the environment.

Consequently, the study established that both the students and the teachers exhibited a high level of awareness of environmental education. In fact, the study observed that a majority of the respondents, a mean of 4.58 of the respondents, observed that schools were indeed playing a pivotal role in fostering environmental sustainability. In fact, it was observed that the schools had an eco-friendly curriculum; with a resultant mean of (mean=4.16) points, out which a majority were students, believed that the curriculum in schools within Oman is well or sufficiently designed to support environmental knowledge. A cross-tabulation analysis between education level and whether the students paid more for environmentally friendly products when there are cheaper alternative shows; that students in grade 10 exhibited stronger behaviours toward preserving the environment compared to grade 11 and 12 students. The result shows that 25% of grade 10 students strongly agree with the above manner compared with 13% for grade 11 and 8% for grade 12. However, if the entire population is considered, the results show that a large section of respondents were willing to pay more for environmentally friendly products despite the presence of cheap alternatives (41.3%). This indicated that the level of knowledge about the environment significantly impacts the students' attitudes towards the environment.

However, the study observed that a group of students exhibited shallow awareness concerning environmental education. To be precise, it seems that respondents were mixing environmental education with the human inductive ability and how to comprehend environmental values through self-observation. It was observed that this was primarily attributed to their social values and morals, which are acquired through social interactions. The study further established that the student's awareness of environmental problems generally high and they further perceived environmental education as environmental problems. In particular, answers to the question of environmental pollution and degradation indicate that most of the respondents believed that it had a significant impact on them. The results (mean=4.28) suggest that they believed an

increase in pollution and environmental degradation in society will have an effect on the population. Furthermore, the study observed that most of the respondents (mean=1.12) indicated a positive outlook toward engaging in pro-environmental activities. This is further illustrated by the willingness to shift attitudes and behaviours towards more supportive pro-environmental initiatives such as conservation or recycling.

Additionally, this study, with consideration to the feedback obtained from the interviewees concerning the factors that students encounter at school that could impact their attitudes and behaviours towards the environment, categorized the diverse factors that impact the students' attitudes towards the environment to three major groups:

1. Environmental education factor

Most of the participants, if not all, did not doubt that the curricula at school played a key role in influencing students' environmental attitudes and behaviours. In fact, the study established that a majority of the respondents believed that schools are doing enough in promoting environmental sustainability. According to the results (mean=4.58), a larger section considered the schools' missions sufficiently structured to address environmental sustainability. Besides, the study further established that environmental education plays an imperative role in enlightening the students on environmental issues that influence their attitude and behaviour in their daily life to life chores.

2. Environmental knowledge factor

This study has further established, thorough responses from the interviewees, that environmental knowledge is a factor in changing their environmental attitudes and behaviours towards the environment. Indeed, a majority deliberated on the role of knowledge in raising a person's awareness, which in turn can strengthen a person's attitudes resulting in their behaviours. Most respondents with; a result (mean=4.16) points out that most students believed

that the curriculum in schools within Oman is effectively and sufficiently designed to disseminate environmental knowledge. Similarly, the study explored the student's environmental knowledge through robust discussions to evaluate their environmental awareness about environmental problems. Most students have proved some awareness of environmental issues within the country and around the world. They provided some examples such as desertification, greenhouse gases and climate change, ozone depletion, and forest fires. Moreover, the study established a high level of awareness as observed in the response of on the possible impact of environmental degradation; where results (mean=4.28) suggest that they believed an increase in pollution and environmental degradation in society will have an effect on the population. However, three students showed a lack of awareness about some environmental issues. Nonetheless, the study also observed through a cross-tabulation between gender and the level of awareness on environmental problems, that it was evident that the female gender is less empowered.

3. School mission factor

Regarding the school mission, this study has discussed the significant role of the school's mission in introducing new educational concepts to students, which can help in changing students' behaviours. To be precise, the study observed that among the respondents from the different educational levels, 150 argued that the approaches adopted by the schools in their missions were sufficient in meeting the knowledge needs of students. However, respondents have provided their school's mission and explained how they enact the school's mission through some school activities during the academic year. In addition, the study established that the majority believed that a school's mission with an environmental element embedded in it contributes to more positive students' environmental self-reported attitudes and behaviours.

To sum up, the study concluded that the majority of the students without wide knowledge of the environmental importance have a negative attitude about the environment, which thus influences the choices of their actions. This study further concludes that schools that have their core mission in endeavoring to uphold environmental regulation and train their students on the environmental importance recorded a good response with regards to environmental behaviours. Environmental education, as the keys of knowledge that helps in unshackling the potential possessed by the young students, helps in training students on environmental matters.

8.5 Dissemination

Matthews and Ross (2014) stated in their study that dissemination is a final stage for the research process and an important way to spread the research's findings to a wider audience. Therefore, this research will contribute new knowledge of environmental issues to students, teachers, and educational curriculum developers at the MOE in Oman through enhancing their awareness of environmental education as an important approach to environmental protection. Many educators have called for approaches that make environmental education relevant for today's world of economic and technological development and environmental degradation. Due to the importance of this research, it will be spread through many traditional academic ways such as conferences and journals, but it will also be disseminated through the MOE websites through their research department. In addition, this research will help the Ministry of Environments to build an effective relationship with the MOE toward protecting the environment through providing schools with modern ways to get rid of the waste that enable the students to practise such environmentally friendly ways.

8.6 Recommendations

To conclude, it can be said that environmental education is an important approach to environmental protection and many educators have called for approaches that make environmental education relevant for today's world of economic and technological development and environmental degradation. Moreover, through conducting this study identified some areas that need attention:

- 1) In accordance to the topic area of the current research and due to fact that environmental education is a new topic area in Oman, and few studies have been conducted on this topic, the reviewer faced some challenges to find scientific articles that covered the key concepts of the proposed topic, which were conducted in the country of Oman. Therefore, the researcher of this study has looked at different countries that have similar attributes to the Omani environment, such as GCC countries.
- 2) The Form of Analysis (Methodological Research Issues): This research seeks to investigate the different factors that influence Omani schools' students' attitudes and behaviours towards the environments. The implemented approaches in the analysis chapters are not free of empirical problems. As such, the findings of this study may have been different if another methodology had been adopted, or a different data set used. Although the analysis of this thesis was based on the mix-methods approach with sequential explanatory design, there are several alternative approaches that can be utilised to answer these research questions. The literature has reported about forty mix-methods research designs (Tashakori and Teddlie, 2003). However, Creswell et al. (2011) have identified the most often used designs, which are six designs including three concurrent and three sequential designs. The three concurrent designs are embedded design, the transformative design, and the multiphase design (for example,

Brady and O'Regan, 2009; Hodgkin, 2008; Natasi et al., 2007). The three sequential designs are the convergent parallel design, the exploratory and explanatory designs (Myers and Oetzel, 2003; Ivankova and Stick, 2007). One alternative research design is to use the concurrent design (Creswell, 2003), as Brady and O'Regan (2009) did. Another approach is to use the sequential exploratory design, for example, see Myers and Oetzel (2003) a study that used the exploratory design. Therefore, it could be argued that none of the previous approaches are free of problems. However, these different approaches should be considered as complementing each other rather than competing with each other.

- 3) Self-report Measures: This study has used a self-reported survey to answer some of the research questions. A very common approach to the methodology that is applied to the behavioural sciences is such that it uses the concept of the ideology called “self-report” questionnaires, which are able to gather all the information for the purpose of the study (Kormos and Gifford, 2014). This method holds a very high reputation for two reasons that are incorporated within. The first reason is the cost factor, with this method being both cheap in terms of the cost as well as the time that is needed in the data collection scenario. This is because all the participants who were used for the study were residents of Oman. The second reason is that the methodology can amalgamate a large number of samples. For example, simply asking the participants to report how often they engage in certain environmental behaviours through a scale from “never” to “every day” is an easy method to gather data about that specific behaviour. In other words, they can be used to investigate pro-environmental behaviours that would be difficult for the researcher of this study to observe. Despite some of the problems that are associated with the usage of the self-reporting questionnaire, there is still a very high demand for this methodology such that it has a high utility in the domain of the behavioural

sciences. However, there has been a very important variable for the researcher to consider in that the researcher wants to use. This is very difficult in the implementation phase because the method would then make it very difficult to make each of the topics be effectively reached by the individual researcher. It is for these reasons that the self-report measures are considered as a major tool for the behavioural research. In addition, it can also be seen that the majority of the problems that are stated can be mitigated through the accurate applications of the self-report measures. One such example of this is that “bias” can be easily extracted by “reversing” one half of the questionnaire's questions, which then can be used for the discrepancy of the score which is present in the positivity while the negative responses are depicted on the other half, which will be able to cancel out the responses which are received because of the bias. There are many scenarios where the statistical techniques are used to identifying false reporting. This can be diminished with the assurance that the data collected treated such that it has the desired privacy as well as the anonymity, which is very important. It very difficult to disregard any of the responses that are received in the self-report measure. However, this can be eliminated by inducing different types of questions, which will allow the students to be more thoughtful in their answers and so that will eliminate any biases as well as induce originality in the answers.

- 4) The social studies that are taught in Omani schools are very much concentrated on the Omani literature only. It is very important to amalgamate diversity within the curriculum, which will be able to focus on a wide variety of topics. This can include global issues that have diversity and in-depth perception. In addition to that, the different grades should have increased difficulty through the introduction of the interdisciplinary areas of the content. In general terms, it can be seen that the curriculum

that is being practised in Omani schools is very shallow, it does not include various departments of the social sciences, especially in regards to the education related to the field of environmental education.

- 5) Within the school context, the integration of more objective teaching approaches in environmental education is key in delivering a more socially responsible culture, and adjusting the school curriculum to ensure a more comprehensive environmental education for the students yields better behavioural intentions. Emphasis should also be placed on creating awareness, harnessing the different forms of digital media inherent in the modern world. Platforms such as social media are effective in disseminating information through a domino effect achieved by seamless networking throughout the globe. Consequently, it will set a precedent for an individual's attitude and behavioural change towards a positive behavioural intention.
- 6) Environmental education instruction must go beyond awareness or knowledge of environmental issues and the importance of a clean environment. Therefore, more emphasis needs to be given to involving students in practical environmental education and problem-solving activities. In other words, students must be given the opportunity to engage in a real problem and encouraged to become responsible for their behaviour to the environment.
- 7) Specific training courses should be designed and provided to environmental education teachers. These training courses will enable the teachers to understand the issues concerning the environment better and at the same time will motivate them in delivering these topics.
- 8) As the environmental education curricula are integrated with science and social studies subjects, the researcher recommends that curriculum developers and decision-makers at the MOE in Oman design a separate environmental education school subject. The

new subject material should contain a sufficient portion of practical activities. Also, the teachers should be involved in the design process of the new curriculum rather than rely on the centralised committee in the MOE. This will help the teachers and the students to focus on the aims of learning environmental education.

- 9) Environmental education is such that it has a very positive and favourable response that is expected in terms of economic development. This is a very important aspect as it will then allow the individual to enhance their environmental education that can result in many positive impacts. These positive outcomes will be pivotal in positive future aspects of the environment.
- 10) Sustainable development can be achieved with the help of awareness that is spread among the students. This requires that the students are provided sufficient knowledge in terms of the environmental factors that will allow the students to have a better and a deeper insight. This insight will then be translated towards their attitudes and behaviours, which will be directed in such a manner that it will allow them provide their designated input towards the environment. In due time, these positive inputs will then be translated to the ability of the country to reach sustainability and the fulfilment of its goals.
- 11) It is also recommended that sustainability goals and the ways to achieve these goals are included within the curriculum. This will provide the students with the much needed information, which can be used for the accurate depiction of activities that will be very helpful in inducing sustainability in broader terms. The education and information provided regarding sustainability will be very useful to ensure that the future generation is well aware of the consequences of environmental problems as well as having the insight on how to counter all the issues arising in this regard.

8.7 Chapter Summary

This is the final chapter of the dissertation. This chapter included a summary of all the key findings that have been established in the designated study. Hence the qualitative, as well as the quantitative analysis that has been implemented, are concluded in this chapter. In addition, this chapter has also provided the necessary recommendations that will allow the research questions and the aims to be enhanced. Finally, this chapter of the research thesis contains the limitations that were faced during the course of the research that has been conducted.

References

- Abdul-Wahab, S.A., Abdulraheem, M.Y. and Hutchinson, M., 2003. The need for inclusion of environmental education in undergraduate engineering curricula. *International Journal of Sustainability in Higher Education*, 4(2), pp.126-137.
- Abdul-Wahab, S.A. (2008) 'A preliminary investigation into the environmental awareness of the Omani public and their willingness to protect the environment', *American Journal of Environmental Sciences*, 4(1), pp.39-49.
- Abdul-Wahab, S.A., Charabi, Y., Al-Rawas, G.A., Al-Maamari, R., Gastli, A. and Chan, K. (2015). 'Greenhouse gas (GHG) emissions in the Sultanate of Oman', *Greenhouse Gases: Science and Technology*, 5(3), pp.339-346.
- Abidin, N.Z., 2010. Investigating the awareness and application of sustainable construction concept by Malaysian developers. *Habitat international*, 34(4), pp.421-426.
- Abidin, N.Z. and Powmya, A., 2014. Perceptions on motivating factors and future prospects of green construction in Oman. *Journal of Sustainable Development*, 7(5), p.231.
- Ajzen, I. (2001) 'Nature and operation of attitudes', *Annual review of psychology*, 52, pp.27-58.
- Ajzen, I., 2002. Residual effects of past on later behavior: Habituation and reasoned action perspectives. *Personality and social psychology review*, 6(2), pp.107-122.
- Ajzen, I., (2011) The theory of planned behaviour: Reactions and reflections, *Psychology & Health*, 26:9, 1113-1127, DOI: [10.1080/08870446.2011.613995](https://doi.org/10.1080/08870446.2011.613995)
- Ajzen, I. (2015) 'Consumer attitudes and behavior: The theory of planned behavior applied to food consumption decisions', *Italian Review of Agricultural Economics*, 70(2), pp.121-138.
- Ajzen, I., and Sheikh, S. (2016) Action versus inaction: anticipated affect in the theory of planned behavior: Erratum.

- Al'Abri, K., 2011. The impact of globalization on education policy of developing countries: Oman as an example. *Literacy Information and Computer Education Journal*, 2(4), pp.491-502.
- Al-Ani, W. (2017) 'Alternative education needs in Oman: accommodating learning diversity and meeting market demand', *International Journal of Adolescence and Youth*, 22(3), pp.322-336.
- Al-Balushi, S.M. and Al-Aamri, S.S. (2014) 'The effect of environmental science projects on students' environmental knowledge and science attitudes', *International Research in Geographical and Environmental Education*, 23, pp.213-227.
- Al-Balushi, S.M. (2016) 'Science Education Research in Oman: Opportunities, Trends, and Challenges' In *Science Education Research and Practice in Asia* (pp.129-153). Singapore: Springer.
- Al-Issa, A.S. and Al-Bulushi, A.H. (2012)' English language teaching reform in Sultanate of Oman: The case of theory and practice disparity', *Educational Research for Policy and Practice*, 11(2), pp.141-176.
- Al Jabri, M., Silvennoinen, H. and Griffiths, D. (2018). 'Teachers' professional development in Oman: Challenges, efforts and solutions', *International Journal of Learning, Teaching and Educational Research*, 17(5), pp.82-103. doi: 10.26803/ijlter.17.5.6
- Al-Jubouri, A.H.H. and Al-Jubouri, M.H.M. (2019) 'The Effectiveness of Teaching in the Gibbs Model in the Decision-Making to Solve the Environmental Problems among Students of College of Education', *Indian Journal of Public Health Research and Development*, 10(1), pp.732-736.
- Al-Maamari, S., Al-Nofli, M. and Al-Gharibi, Z. (2014) 'The state of social studies in basic education schools in Oman', *Asian Social Science*, 10, pp.213-220.

- Al-Maamari, S., 2014. Education for developing a global Omani citizen: Current practices and challenges. *Journal of Education and Training Studies*, 2(3), pp.108-117.
- Al-Naamani, N., 2016. *Strategic work between agencies in the planning system for sustainable flood management: the case of Oman* (Doctoral dissertation, Heriot-Watt University).
- Al Nabhani, M. (2007). *Developing the education system in the Sultanate of Oman through implementing total quality management-the Ministry of Education Central headquarters-a case study* (Doctoral dissertation), University of Glasgow.
- Al-Najar, N. (2016), 'View of education development in Oman', *International Journal of Academic Research in Education and Review*, 4(1), pp.10-18.
- Al-Nofli, M.A., 2010. Students' perceptions about geography: A study of basic education school students in Oman. *European Journal of Social Sciences*, 16(1), pp.11-20.
- Alshoaibi, H.S., 2018. *Towards Improving the Education Funding Policy in Oman: Lessons Learned from Other Oil Dependent Nations*. Southern Illinois University at Carbondale.
- Aman, A.L., Harun, A. and Hussein, Z. (2012) 'The influence of environmental knowledge and concern on green purchase intention the role of attitude as a mediating variable', *British Journal of Arts and Social Sciences*, 7, pp.145-167.
- Ambusaidi, A. and Al-Rabaani, A., 2009. Environmental education in the Sultanate of Oman: Taking sustainable development into account. In *Environmental education in context* (pp. 37-50). Brill Sense.
- Ambusaidi, A., Boyes, E., Stanisstreet, M. and Taylor, N., 2012. Omani students' views about global warming: Beliefs about actions and willingness to act. *International Research in Geographical and Environmental Education*, 21(1), pp.21-39.

- Ambusaidi, A., Malandrakis, G., Kilinc, A., Stanisstreet, M., Boyes, E. and Taylor, N. (2014) 'Omani school and university students' opinions about public transport: incentives and disincentives', *Economic and Environmental Studies*, 14, pp.97-123.
- Andersson, C. and Stage, J. (2018) 'Direct and indirect effects of waste management policies on household waste behaviour: The case of Sweden', *Waste Management*, 76, pp.19-27.
- Baert, P. (2005) *Philosophy of the social sciences: Towards pragmatism*. Polity.Cambridge, United Kingdom
- Bamberg, S. (2003) 'How does environmental concern influence specific environmentally related behaviors? A new answer to an old question', *Journal of Environmental Psychology*, 23, pp.21-32.
- Bamberg, S. and Möser, G. (2007) 'Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour', *Journal of Environmental Psychology*, 27, pp.14-25.
- Barber, Nelson; Taylor, David C.; and Strick, Sandy, "Environmental Knowledge and Attitudes: Influencing the Purchase Decisions of Wine Consumers" (2009). International CHRIE Conference-Refereed Track. 16.
- Barraza, L., (2001) 'Perception of social and environmental problems by English and Mexican school children', *Canadian Journal of Environmental Education (CJEE)*, 6(1), pp.139-157.
- Barraza, L. and Walford, R.A. (2002) 'Environmental education: A comparison between English and Mexican school children', *Environmental Education Research*, 8(2), pp.171-186.
- Bazeley, P. and Jackson, K. eds., 2013. *Qualitative data analysis with NVivo*. Sage Publications Limited.London, United Kingdom.

- Beah.om. (2017). [online] Available at: <http://www.beah.om/> [Accessed 8 Aug. 2018].
- Becker, S., Bryman, A. and Ferguson, H. (eds.) (2012). *Understanding research for social policy and social work: themes, methods and approaches*. Policy Press.Bristol, United Kingdom.
- Blok, V., Wesselink, R., Studynka, O., and Kemp, R. (2015). 'Encouraging sustainability in the workplace: a survey on the pro-environmental behaviour of university employees', *Journal of Cleaner Production*, 106, pp.55-67.
- Bohdanowicz, P., 2006. Environmental awareness and initiatives in the Swedish and Polish hotel industries—survey results. *International Journal of Hospitality Management*, 25(4), pp.662-682.
- Bokova (2011) "Education for sustainable development: Oman's journey" – 'Oman Observer', Oman | United Nations Educational, Scientific and Cultural Organization.. Retrieved from <http://www.unesco.org/new/en/goodwill-ambassadors/news-single->
- Bonett, D.G. and Wright, T.A., (2015) 'Cronbach's alpha reliability: Interval estimation, hypothesis testing, and sample size planning', *Journal of Organizational Behavior*, 36(1), pp.3-15.
- Boon, H. J. (2016) 'Pre-service teachers and climate change: A stalemate?', *Australian Journal of Teacher Education (Online)*, 41(4), p.39-63.
- Borges, F. (2019). 'Knowledge, Attitudes and Behaviours Concerning Sustainable Development: A Study among Prospective Elementary Teachers', *Higher Education Studies*, 9(2), pp.22-32.
- Bourne, C. (2006) 'A theory of presentism', *Canadian Journal of Philosophy*, 36(1), pp.1-23.
- Brady, B. and O'Regan, C. (2009) 'Meeting the challenge of doing an RCT evaluation of youth mentoring in Ireland: A journey in mixed methods', *Journal of Mixed Methods Research*, 3(3), pp.265-280.

- Braun, V., Clarke, V., Hayfield, N. and Terry, G., (2018) 'Thematic analysis', *Handbook of Research Methods in Health Social Sciences*, pp.1-18.
- Bruner, J.S., 2009. *The process of education*. Harvard University Press. United States of America.
- Breiting, S. and Wickenberg, P., (2010) 'The progressive development of environmental education in Sweden and Denmark', *Environmental Education Research*, 16(1), pp.9-37.
- Bryman, A. and Cramer, D. (2004) *Quantitative data analysis with SPSS 12 and 13: A guide for social scientists*. Routledge. New York, United States.
- Buckingham, S. (2005) *Gender and environment*. Routledge. London, United Kingdom.
- Buetow, S., 2010. Thematic analysis and its reconceptualization as 'saliency analysis'. *Journal of Health Services Research & Policy*, 15(2), pp.123-125.
- Bulu, S.T. (2012) 'Place presence, social presence, co-presence, and satisfaction in virtual worlds', *Computers & Education*, 58, pp.154-161.
- Carfora, V., Caso, D., Sparks, P., and Conner, M. (2017) 'Moderating effects of pro-environmental self-identity on pro-environmental intentions and behaviour: A multi-behaviour study', *Journal of Environmental Psychology*, 53, pp.92-99.
- Castro, F.G., Kellison, J.G., Boyd, S.J. and Kopak, A., 2010. A methodology for conducting integrative mixed methods research and data analyses. *Journal of mixed methods research*, 4(4), pp.342-360.
- Chang, C.H. and Kidman, G. (2018) Reflecting on recent geographical and environmental education issues. *International Research in Geographical and Environmental Education*, 27:1, 1-4, DOI: 10.1080/10382046.2018.1410348.

- Chao, Y.L. and Lam, S.P. (2011) 'Measuring responsible environmental behavior: Self-reported and other-reported measures and their differences in testing a behavioral model', *Environment and Behavior*, 43(1), pp.53-71.
- Chen, I.Y. and Chen, N.S. (2009) 'Examining the factors influencing participants' knowledge sharing behavior in virtual learning communities', *Journal of Educational Technology & Society*, 12, p.134-148.
- Choudri, B.S., Baawain, M., Al-Sidairi, A., Al-Nadabi, H. and Al-Zeidi, K. (2016) 'Perception, knowledge and attitude towards environmental issues and management among residents of Al-Suwaiq Wilayat, Sultanate of Oman', *International Journal of Sustainable Development and World Ecology*, 23(5), pp.433-440.
- Christensen, L.B., Johnson, B., Turner, L.A. and Christensen, L.B. (2011) *Research methods, design, and analysis*. Pearson, United States of America
- Clayton, S. and Myers, G. (2015). *Conservation psychology: Understanding and promoting human care for nature*, John Wiley and Sons, United Kingdom.
- Cohen, L., Manion, L. and Morrison, K. (2011) *Research methods in education*, Routledge. London, United Kingdom.
- Cohen, L., Manion, L. and Morrison, K. (2013) 'Action research' In *Research methods in education* (pp.368-385). Routledge. London, United Kingdom.
- Cohen, L., Morrison, K. and Manion, L. (2017) 'Mixed methods research' In *Research methods in education* (pp. 59-78). Routledge. London United Kingdom.
- Collins, C.M., Steg, L. and Koning, M.A. (2007) 'Customers' values, beliefs on sustainable corporate performance, and buying behavior', *Psychology & Marketing*, 24, pp.555-577.
- Courtenay-Hall, P. and Rogers, L., 2002. Gaps in mind: Problems in environmental knowledge-behaviour modelling research. *Environmental Education Research*, 8(3), pp.283-297.

- Osborne, J.W., Costello, A.B. and Kellow, J.T., 2008. Best practices in exploratory factor analysis. *Best practices in quantitative methods*, pp.86-99.
- Creswell, J.W. (2002) *Educational research: Planning, conducting, and evaluating quantitative* (pp. 146-166). Upper Saddle River, NJ: Prentice Hall.
- Creswell, J. W. (2003). Research design: Qualitative, quantitative, and mixed methods approaches (2nd ed.). Thousand Oaks, CA: Sage.London, United Kingdom.
- Creswell, J.W. (2014) *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (4th ed.). Thousand Oaks, CA: Sage.London, United Kingdom.
- Creswell, J.W. and Poth, C.N., 2017. *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.Thousand Oaks, California.
- Creswell, J.W., 2011. Controversies in mixed methods research. *The Sage handbook of qualitative research*, 4, pp.269-284.
- Creswell, J.W., Klassen, A.C., Plano Clark, V.L. and Smith, K.C., 2011. Best practices for mixed methods research in the health sciences. *Bethesda (Maryland): National Institutes of Health*, 2013, pp.541-545.
- Creswell, J.W., Plano Clark, V.L., Gutmann, M.L. and Hanson, W.E., 2003. Advanced mixed methods research designs. *Handbook of mixed methods in social and behavioral research*, p.209-240.
- Cronk, B.C. (2016) *How to use IBM SPSS statistics: A step-by-step guide to analysis and interpretation*. Routledge.
- Dal, B., Alper, U., Özdem-Yilmaz, Y., Öztürk, N. and Sönmez, D. (2015) 'A model for pre-service teachers' climate change awareness and willingness to act for pro-climate change friendly behavior: adaptation of awareness to climate change

- questionnaire', *International Research in Geographical and Environmental Education*, 24(3), pp.184-200.
- De Groot, J.I. and Steg, L., 2009. Morality and prosocial behavior: The role of awareness, responsibility, and norms in the norm activation model. *The Journal of social psychology*, 149(4), pp.425-449.
- De Leeuw, A., Valois, P., Ajzen, I. and Schmidt, P. (2015) 'Using the theory of planned behavior to identify key beliefs underlying pro-environmental behavior in high-school students: Implications for educational interventions', *Journal of Environmental Psychology*, 42, pp.128-138.
- DeWaters, J.E. and Powers, S.E., 2011, October. Improving energy literacy among middle school youth with project-based learning pedagogies. In *2011 Frontiers in Education Conference (FIE)* (pp. T1D-1). IEEE.
- Dillon, J. (2016). *Towards a convergence between science and environmental education: The selected works of Justin Dillon*. Taylor and Francis. New York
- Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J. and Wagner, G.G. (2011) 'Individual risk attitudes: Measurement, determinants, and behavioral consequences', *Journal of the European Economic Association*, 9, pp.522-550.
- Dörnyei, Z. (2007) Research methods in applied linguistics: Quantitative, qualitative, and mixed methodologies (pp. 95-123). Oxford: Oxford University Press.
- Drews, S. and Van den Bergh, J.C. (2016) 'What explains public support for climate policies? A review of empirical and experimental studies', *Climate Policy*, 16(7), pp.855-876.
- Education Council (2019). مجلس التعليم. [online] Available at: <https://www.educouncil.gov.om/en/index.php?scrollto=start> (Accessed: 14 Mar 2019).

- Edwards, A.R. (2010) *Thriving beyond sustainability: Pathways to a resilient society*. New Society Publishers.Canada
- Ertz, M., Karakas, F., and Sarigöllü, E. (2016). 'Exploring pro-environmental behaviors of consumers: An analysis of contextual factors, attitude, and behaviors', *Journal of Business Research*, 69(10), pp.3971-3980.
- ESO (2019). *ESO*. [online] Available at: <http://www.eso.org.om/> (Accessed: 21 Jul 2019).
- Fabrigar, L.R. and Wegener, D.T., 2011. *Exploratory factor analysis*. Oxford University Press. New York.
- Feilzer, M.Y. (2010) 'Doing mixed methods research pragmatically: Implications for the rediscovery of pragmatism as a research paradigm', *Journal of Mixed Methods Research*. 4, pp.6-16.
- Fetters, M.D., Curry, L.A. and Creswell, J.W. (2013) 'Achieving integration in mixed methods designs—principles and practices', *Health services research*, 48(6pt2), pp.2134-2156.
- Folaranmi A., A., Asukwo, E. and B. Eyiwumi, A. (2018) “Comparative Analysis of Senior Secondary Schools Science Teachers and Students Knowledge, Attitudes and Practices to Global Warming in Kwara State, Nigeria”, *Journal of Education, Society and Behavioural Science*, 27(2), pp. 1-8. doi: 10.9734/JESBS/2018/21550.
- Freeman III, A.M., Herriges, J.A. and Kling, C.L. (2014) *The measurement of environmental and resource values: theory and methods*, Routledge. New York
- Gale, R.M. (2005) *The Philosophy of William James: An Introduction*. Cambridge University Press.United Kingdom.
- Genc, M. (2015). The project-based learning approach in environmental education. *International Research in Geographical and Environmental Education*, 24(2), 105-117.

- Geyer, R., Kuczenski, B., Zink, T., and Henderson, A. (2016). 'Common misconceptions about recycling', *Journal of Industrial Ecology*, 20(5), pp.1010-1017.
- Gifford, R. and Nilsson, A. (2014) 'Personal and social factors that influence pro-environmental concern and behaviour: A review', *International Journal of Psychology*, 49(3), pp.141-157.
- Gilbert, R.M. and Millenson, J.R. (eds.) (2014) *Reinforcement: Behavioral analyses*. Academic Press. London, United Kingdom.
- Goveas, S. and Aslam, N., 2011. A Role and Contributions of Women in the Sultanate of Oman. *International Journal of Business and Management*, 6(3), p.232.
- Greene, J. C. (2007) *Mixed Methods in Social Inquiry*. San Francisco, CA: John Wiley & Sons.
- Griggs, D., Stafford-Smith, M., Gaffney, O., Rockström, J., Öhman, M.C., Shyamsundar, P., Steffen, W., Glaser, G., Kanie, N. and Noble, I., 2013. Policy: Sustainable development goals for people and planet. *Nature*, 495(7441), p.305-307.
- Hargreaves, T. (2011) 'Practice-ing behaviour change: Applying social practice theory to pro-environmental behaviour change', *Journal of Consumer Culture*, 11, pp.79-99
- Harth, N.S., Leach, C.W. and Kessler, T. (2013) 'Guilt, anger, and pride about in-group environmental behaviour: Different emotions predict distinct intentions', *Journal of Environmental Psychology*, 34, pp.18-26.
- Heberlein, T.A. (2012) 'Navigating environmental attitudes', *Conservation Biology*, 26, pp.583-585.
- Hadavi, S., Kaplan, R. and Hunter, M.C.R. (2015) 'Environmental affordances: A practical approach for design of nearby outdoor settings in urban residential areas', *Landscape and urban planning*, 134, pp.19-32.
- Han, H. (2015). 'Travelers' pro-environmental behavior in a green lodging context: Converging value-belief-norm theory and the theory of planned behavior', *Tourism Management*, 47, 164-177.

- Harding, D., Kadiyono, A.L., Hafiar, H. and Wibowo, H. (2018). 'Mind the Gap: What are the Barriers to Pro-Environmental Behavior among Students?', *Journal of Business and Social Review in Emerging Economies*, 4(1), pp.1-6.
- Hardy, M.A. and Bryman, A. (eds.) (2009). *Handbook of data analysis*. Sage. London, United Kingdom.
- Harrits, G.S. (2011) 'More than method?: A discussion of paradigm differences within mixed methods research', *Journal of Mixed Methods Research*, 5, pp.150-166.
- Hedefalk, M., Almqvist, J. and Östman, L. (2015) 'Education for sustainable development in early childhood education: A review of the research literature', *Environmental Education Research*, 21(7), pp.975-990.
- Hermans, M., and Korhonen, J. (2017) 'Ninth graders and climate change: Attitudes towards consequences, views on mitigation, and predictors of willingness to act', *International Research in Geographical and Environmental Education*, 26(3), pp.223-239.
- Hines J.M., Harold R.H. and Audrey N.T. (1987) 'Analysis and synthesis of research on responsible environmental behavior: A meta-analysis', *The Journal of Environmental Education*, 18(2), pp.1-8. DOI: [10.1080/00958964.1987.9943482](https://doi.org/10.1080/00958964.1987.9943482)
- Hodgkin, S. (2008) 'Telling it all: A story of women's social capital using a mixed methods approach', *Journal of Mixed Methods Research*, 2(4), pp.296-316.
- Hollweck, T., 2015. Robert K. Yin.(2014). *Case Study Research Design and Methods* . Thousand Oaks, CA: Sage. 282 pages. *Canadian Journal of Program Evaluation*, 30(1).
- Howard, M.C., 2016. A review of exploratory factor analysis decisions and overview of current practices: What we are doing and how can we improve?. *International Journal of Human-Computer Interaction*, 32(1), pp.51-62.

- Husaini, I.G., Garg, A., Kim, K.H., Marchant, J., Pollard, S.J. and Smith, R., 2007. European household waste management schemes: Their effectiveness and applicability in England. *Resources, conservation and recycling*, 51(1), pp.248-263.
- IPCC. (2001). *Intergovernmental Panel on Climate Change: Third assessment report*. Retrieved from <http://www.grida.no/climate/ipcc>
- IPCC. (2007). *Intergovernmental Panel on Climate Change: Fourth assessment report (AR4)*. Retrieved from <http://www.ipcc.ch/>
- Ignatow, G. (2006) 'Cultural models of nature and society: Reconsidering environmental attitudes and concern', *Environment and behavior*, 38, pp.441-461.
- Issan, S. and Gomaa, N., 2010. Knowledge work supervision: Transforming Omani schools into learning organizations. *The FM Duffy Reports*, 15(2).
- Israel, M. (2014) *Research ethics and integrity for social scientists: Beyond regulatory compliance*. Sage. London, United Kingdom.
- Israel, M. and Hay, I. (2006) *Research ethics for social scientists*. Sage. London, United Kingdom.
- Iwaro, J. and Mwashia, A. (2010) 'A review of building energy regulation and policy for energy conservation in developing countries', *Energy Policy*, 38, pp.7744-7755.
- Ivankova, N.V. and Stick, S.L. (2007) 'Students' persistence in a distributed doctoral program in educational leadership in higher education: A mixed methods study', *Research in Higher Education*, 48(1), p.93-135.
- Jensen, B.B., 2002. Knowledge, action and pro-environmental behaviour. *Environmental education research*, 8(3), pp.325-334.
- Joffe, H. (2012) 'Thematic analysis' *Qualitative Research Methods in Mental Health and Psychotherapy* (eds D. Harper and A. R. Thompson). doi:10.1002/9781119973249.ch

- Johnson, R.B., Onwuegbuzie, A.J. and Turner, L.A. (2007) 'Toward a definition of mixed methods research', *Journal of Mixed Methods Research*, 1(2), pp.112-133.
- Jolliffe, I., 2011. *Principal component analysis* (pp. 1094-1096). Springer. Berlin, Heidelberg.
- Karimi, S. (2019). 'Pro-environmental behaviours among agricultural students: An examination of the Value-Belief-Norm Theory', *Journal of Agriculture Sciences and Technology*, 21(2), pp.249-263.
- Kaiser, F.G., Hübner, G. and Bogner, F.X., 2005. Contrasting the Theory of Planned Behavior with the Value-Belief-Norm Model in Explaining Conservation Behavior 1. *Journal of applied social psychology*, 35(10), pp.2150-2170.
- Kaiser, F.G., Oerke, B. and Bogner, F.X. (2007) 'Behavior-based environmental attitude: Development of an instrument for adolescents', *Journal of Environmental Psychology*, 27(3), pp.242-251.
- Kemmelmeier, M., Krol, G. and Kim, Y.H. (2002) 'Values, economics, and proenvironmental attitudes in 22 societies', *Cross-cultural Research*, 36(3), pp.256-285.
- Kemp, R., Parto, S. and Gibson, R.B., 2005. Governance for sustainable development: moving from theory to practice. *International journal of sustainable development*, 8(1-2), pp.12-30.
- Kennedy, E.H., Beckley, T.M., Mcfarlane, B.L. and Nadeau, S. (2009) 'Why we don't "walk the talk": Understanding the environmental values/behaviour gap in Canada', *Human Ecology Review*, 16 (2), pp.151-160.
- Khan, M. (2013). 'From access to success: the story of Oman's school education system', *Muscat Daily News*. Available at: <https://muscatdaily.com//Archive/Oman/From-access-to-success-The-story-of-Oman-s-school-education-system-2pri> (Accessed: 10 Feb 2019).

- Killeen, P.R. and Jacobs, K.W., 2017. Coal is not black, snow is not white, food is not a reinforcer: The roles of affordances and dispositions in the analysis of behavior. *The Behavior Analyst*, 40(1), pp.17-38.
- Kirschner, P. A., Kreijns, K., Phielix, C., & Fransen, J. (2015). Awareness of cognitive and social behaviour in a CSCL environment. *Journal of Computer Assisted Learning*, 31(1), 59-77.
- Kline, P., 2014. *An easy guide to factor analysis*. Routledge. New York, United States of America.
- Kollmuss, A., & Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, 8(3), 239–260.
- Kopnina, H., 2012. Education for sustainable development (ESD): the turn away from ‘environment’ in environmental education? *Environmental Education Research*, 18(5), pp.699-717.
- Kormos, C. and Gifford, R. (2014) 'The validity of self-report measures of proenvironmental behavior: A meta-analytic review', *Journal of Environmental Psychology*, 40, pp.359-371.
- Kotrlik, J.W.K.J.W. and Higgins, C.C.H.C.C., 2001. Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research. *Information technology, learning, and performance journal*, 19(1), p.43.
- Kowal, S. and O’Connell, D.C., 2014. Transcription as a crucial step of data analysis. *The SAGE handbook of qualitative data analysis*, pp.64-79.
- KPMG, Oman Budget, 2019. KPMG, [Accessed 8 April 2020].
Available at: <<https://assets.kpmg/content/dam/kpmg/ae/pdf/Oman-budget-2019.pdf>>

- Kroesen, M., Handy, S. and Chorus, C. (2017) 'Do attitudes cause behavior or vice versa? An alternative conceptualization of the attitude-behavior relationship in travel behavior modeling', *Transportation Research Part A: Policy and Practice*, 101, pp.190-202.
- Kusturica, M.P., Tomas, A., and Sabo, A. (2016) 'Disposal of unused drugs: Knowledge and behavior among people around the world', *Reviews of Environmental Contamination and Toxicology*, 240, pp.71-104. Springer, Cham.
- Leal Filho, W. (2015). 'Transformative approaches to sustainable development at universities', *Working across disciplines*, Springer, Cham. Switzerland.
- UNESCO (2018) 'Learning from Oman's education system' Available at: <http://www.iiep.unesco.org/en/learning-omans-education-system-2849>. [Accessed 10 Jun. 2018]
- Lin, E. and Shi, Q. (2014) 'Exploring individual and school-related factors and environmental literacy: Comparing US and Canada using PISA 2006', *International Journal of Science and Mathematics Education*, 12(1), pp.73-97.
- Lu, A.C.C., Gursoy, D. and Del Chiappa, G. (2016) 'The influence of materialism on ecotourism attitudes and behaviors', *Journal of Travel Research*, 55(2), pp.176-189.
- Malec, M. (2018). *Essential statistics for social research*. Routledge. New York, United States of America.
- Mansour, H., Al-Yahyai, F. and Heiba, E. (2018) The Recycling Concept in Art Education at Sultan Qaboos University. 2(2), p. 82-87.
- Mansour, N. and Al-Shamrani, S. (2015) The context of science education in the Arab gulf states. *Science Education in the Arab Gulf States*.
- Marshall, C. and Rossman, G.B. (2014) *Designing qualitative research*. Sage publications. United States of America.
- Martin, C. and Czellar, S. (2016) 'The extended Inclusion of Nature in Self scale', *Journal of Environmental Psychology*, 47, pp.181-194.

- Matthews, B. and Ross, L., 2014. *Research methods*. Pearson Higher Ed. England, United Kingdom.
- Maxcy, S.J. (2003) 'Pragmatic threads in mixed methods research in the social sciences: the search for multiple modes of inquiry and the end of the philosophy of formalism' In Tashakkori, A., and C. Teddlie (Eds.), *Handbook of Mixed Methods in Social and Behavioral Research*. Thousand Oaks, CA: Sage Publications.
- McCright, A.M., (2010) 'The effects of gender on climate change knowledge and concern in the American public', *Population and Environment*, 32(1), pp.66-87.
- Meca.gov.om. (2019). *Ministry of Environment and Climate Affairs - Oman*. [online] Available at: <https://meca.gov.om/en/> [Accessed 4 Jun. 2018].
- Milfont, T.L. (2009) 'The effects of social desirability on self-reported environmental attitudes and ecological behaviour', *The Environmentalist*, 29(3), pp.263-269.
- Milfont, T. L. & Gouveia, V. V. 2006. Time perspective and values: An exploratory study of their relations to environmental attitudes. *Journal of Environmental Psychology*, 26, 72-82.
- Milfont, T.L. and Duckitt, J. (2010) 'The environmental attitudes inventory: A valid and reliable measure to assess the structure of environmental attitudes', *Journal of Environmental Psychology*, 30(1), pp.80-94.
- MOE (2004). *National Report on Quality Education in Oman*. MOE. Muscat, Oman.
- Moe.gov.om. (2019). [online] Available at: <http://www.moe.gov.om> (Accessed: 1 Feb 2019).
- MOE (2007a) *Education for All in the Sultanate of Oman: Midterm Report*. MOE. Muscat, Oman.
- Morgan, D.L. (2007). 'Paradigms lost and pragmatism regained. Methodological implications of combining qualitative and quantitative methods', *Journal of Mixed Methods Research*, 1, pp.48-76.

- Mostafa, M.M. (2007) 'Gender differences in Egyptian consumers' green purchase behaviour: the effects of environmental knowledge, concern and attitude', *International Journal of Consumer Studies*, 31(3), pp.220-229.
- Mulà, I., Tilbury, D. and United Nations Educational, Scientific and Cultural Organization (UNESCO); United Nations Decade of Education for Sustainable Development 2005-2014, 2011. National journeys towards education for sustainable development, 2011: reviewing national experiences from Chile, Indonesia, Kenya, the Netherlands, Oman.
- Munang, R., Thiaw, I., Alverson, K., Mumba, M., Liu, J. and Rivington, M., (2013) 'Climate change and Ecosystem-based Adaptation: a new pragmatic approach to buffering climate change impacts', *Current Opinion in Environmental Sustainability*, 5(1), pp.67-71.
- Murphy, T. (2002) 'The Minnesota report card on environmental literacy' Hamline University. *Center for Global Environmental Education*.(ERIC Reproduction Service No. ED 474505).
- Murphy, T. (2004) 'The second Minnesota report card on environmental literacy' *Hamline University and Minnesota Pollution Control Agency. St. Paul, Minnesota*.
- Muscat Daily News . (2017). *Nearly 750,000 students in sultanate's schools - Oman*. [online] Muscat Daily News. Available at: <https://www.muscatdaily.com/Archive/Oman/Nearly-750-000-students-in-sultanate-s-schools-52rk> (Accessed: 5 Aug 2019).
- Myers, K.K. and Oetzel, J.G. (2003) 'Exploring the dimensions of organizational assimilation: Creating and validating a measure', *Communication Quarterly*, 51(4), pp.438-457.
- Nasser, R. (2019). Educational Reform in Oman: System and Structural Changes. In *Education Systems Around the World*. IntechOpen.

- Natasi, B.K., Hitchcock, J., Sarkar, S., Burkholder, G., Varjas, K. and Jayasena, A. (2007) 'Mixed methods in intervention research', *Journal of Mixed Methods*, 1(2), pp.164-182.
- NCSI.gov.om.(2019). Home.[online]Available at: <https://www.ncsi.gov.om/Pages/NCSI.aspx> (Accessed: 19 Mar 2019).
- NCIS.gov.om.(2020). Accessed: 25 March 2020 vol.31 monthly statistics.
- Nolan, J.M., Schultz, P.W., Cialdini, R.B., Goldstein, N.J. and Griskevicius, V. (2008) 'Normative social influence is underdetected', *Personality and Social Psychology Bulletin*, 34, pp.913-923.
- Nordlund, A.M. and Garvill, J., 2002. Value structures behind proenvironmental behavior. *Environment and behavior*, 34(6), pp.740-756.
- O'Donoghue, G., Perchoux, C., Mensah, K., Lakerveld, J., Van Der Ploeg, H., Bernaards, C., ... and Nazare, J. A. (2016) 'A systematic review of correlates of sedentary behaviour in adults aged 18–65 years: a socio-ecological approach', *BMC Public Health*, 16(1), p.2-25.
- Sustainable Oman. Omani Environmental Laws and Regulations (2018). Available at: <http://www.sustainableoman.com/legislation>.
- Omomia, O.A. and Omomia, T.A., (2014) 'Relevance of Skinner's Theory of Reinforcement on effective school evaluation and management' *European Journal of Psychological Studies*, (4), pp.174-180.
- Onwezen, M.C., Antonides, G. and Bartels, J. (2013) 'The Norm Activation Model: An exploration of the functions of anticipated pride and guilt in pro-environmental behaviour', *Journal of Economic Psychology*, 39, pp.141-153.
- Orcher, L.T. (2016) *Conducting research: Social and behavioral science methods*. Routledge.New York, United States of America.

- O'Riordan, T. (2014) *Environmental Science For Environmental Management*. Routledge. London , United Kingdom.
- Oxford Business Group (2019) *Oman's education sector focuses on quality and the right skills to meet the needs of the economy*. Available at:
<https://oxfordbusinessgroup.com/overview/keys-success-focusing-quality-and-right-skills-meet-needs-economy> (Accessed: 10 Feb 2019),
- Palinkas, L.A., Horwitz, S.M., Green, C.A., Wisdom, J.P., Duan, N. and Hoagwood, K. (2015) 'Purposeful sampling for qualitative data collection and analysis in mixed method implementation research', *Administration and policy in mental health and mental health services research*, 42(5), pp.533-544.
- Patten, M.L. (2016) *Questionnaire research: A practical guide*. Routledge. New York, United States of America.
- Paul, J., Modi, A. and Patel, J. (2016) 'Predicting green product consumption using theory of planned behavior and reasoned action', *Journal of Retailing and Consumer Services*, 29, pp.123-134.
- Paulhus, D.L. and Vazire, S., (2007) 'The self-report method', *Handbook of Research Methods in Personality Psychology*, 1, pp.224-239.
- Peters, R.S., 2010. John Dewey's philosophy of education. In *John Dewey reconsidered (International Library of the Philosophy of Education Volume 19)* (pp. 73-86). Routledge.
- Phillips, D. (Ed.), (2000). *Constructivism in education*. Chicago: University of Chicago Press.
- Pope, C., Ziebland, S. and Mays, N., 2000. Analysing qualitative data. *Bmj*, 320(7227), pp.114-116.

- Poortinga, W., Steg, L. and Vlek, C. (2004) 'Values, environmental concern, and environmental behavior: A study into household energy use', *Environment and Behavior*, 36, pp.70-93.
- Pringle, R. M. & Clayton, G. (2010). Conservation psychology: understanding and promoting human care for nature. *Environmental Conservation*, 37, 222.
- Punch, K.F. and Oancea, A. (2014). *Introduction to research methods in education*. Sage. London, United Kingdom.
- Rafe, M., Khosravipour, B., Moosavi, S. A., and Roozbahani, M. (2015). 'Identify affecting factors on student's environmental protection behavior', *Int. J. Adv. Bio-log. Bio-med. Res*, 3(1), pp.55-60.
- Rafe, M., Khosravipour, B., Moosavi, S.A. and Roozbahani, M., (2015). Identify Affecting Factors on Student's Environmental Protection Behavior. *International Journal of Advanced Biological and Biomedical Research*, 3(1), pp.55-60.
- Reid, W.V., Mooney, H.A., Cropper, A., Capistrano, D., Carpenter, S.R., Chopra, K., Dasgupta, P., Dietz, T., Duraiappah, A.K., Hassan, R. and Kasperson, R., 2005. *Ecosystems and human well-being-Synthesis: A Report of the Millennium Ecosystem Assessment*. Island Press. Washington D.C.
- Richardson, V., 2003. Constructivist pedagogy. *Teachers college record*, 105(9), pp.1623-1640.
- Rimal, R.N. and Real, K., 2005. How behaviors are influenced by perceived norms: A test of the theory of normative social behavior. *Communication research*, 32(3), pp.389-414.
- Robins, R.W., Tracy, J.L. and Sherman, J.W. (2007) 'What kinds of methods do personality psychologists use?', *Handbook of Research Methods in Personality Psychology*, pp.673-678.
- Robson, C. 2002, *Real world research*, Blackwell Publications, United States of America.

- Roulston, K. (2010) *Reflective interviewing: A guide to theory and practice*. Sage.London, Uk.
- Runhaar, P. et al. (2019) 'Encouraging Students' Pro-environmental Behaviour: Examining the Interplay Between Student Characteristics and the Situational Strength of Schools', *Journal of Education for Sustainable Development*, 13(1), pp. 45–66. doi: 10.1177/0973408219840544.
- Sawitri, D.R., Hadiyanto, H., and Hadi, S.P. (2015) 'Pro-environmental behavior from a socialcognitive theory perspective', *Procedia Environmental Sciences*, 23, pp.27-33.
- Schultz, P.W. (2014) Strategies for promoting proenvironmental behavior. *European Psychologist*. 19(2), pp. 107-117.
- Schwartz, S.H., 1977. Normative influences on altruism. In *Advances in experimental social psychology* (Vol. 10, pp. 221-279). Academic Press.Netherlands.
- Schwartz, S.H. (2012) An overview of the Schwartz theory of basic values. *Online readings in Psychology and Culture*, 2(1), p.11-20.
- Schmuck, P., & Schultz, W. P. (Eds.). (2012). *Psychology of sustainable development*. Springer Science & Business Media. New York, USA
- Schwarzer, R. (2014) *Self-efficacy: Thought control of action*. Taylor & Francis. New York , United States of America.
- Sencovici, M. and Costache, A. (2012) 'Methods and means of evaluating the perception concerning the environmental condition. case study: The urban ecosystem of TÂrgoviste (Romania)', *International Multidisciplinary Scientific GeoConference: SGEM: Surveying Geology & mining Ecology Management*, 5, p.571-578.
- Sengupta, M., Das, J. and Maji, P.K. (2010) Environmental awareness and environment related behaviour of twelfth grade students in Kolkata: Effects of stream and gender. *Anwesa*, 5, pp.1-8.

- Shusterman, R., (2016) *Practicing philosophy: Pragmatism and the philosophical life*. Routledge. New York, United States of America.
- Siegling, A.B., Saklofske, D.H. and Petrides, K.V., 2015. Measures of ability and trait emotional intelligence. In *Measures of personality and social psychological constructs* (pp. 381-414). Academic Press. London, United Kingdom.
- Silverman, D. (ed.) (2016) *Qualitative research*. Sage. London, United Kingdom.
- Simaika, J.P. and Samways, M.J. (2010) 'Biophilia as a universal ethic for conserving biodiversity', *Conservation Biology*, 24(3), pp.903-906.
- Siswanto, S. (2018). Kajian Perilaku Pengguna Ruang Publik DI Kota Malang. *PAngripta Jurnal Ilmiah Kajian Perencanaan Pembangunan*, 1(2), 192-204.
- Skinner, B.F. (1953) *Science and human behavior*, Simon and Schuster. 1230 Avenue of the Americas, New York, NY 10020
- Smith, G. T. (2005) 'On construct validity: Issues of method and measurement', *Psychological Assessment*, 17, pp.396-408.
- Snelson, C. L. (2016). Qualitative and mixed methods social media research: A review of the literature. *International Journal of Qualitative Methods*, 15(1), 1-15. Sage Publication, USA.
- Stevenson, R. B. (2007a). Schooling and environmental education: Contradictions in purpose and practice. *Environmental Education Research*, 13, 139-153.
- Stevenson, R.B., Brody, M., Dillon, J. and Wals, A.E., 2013. *International handbook of research on environmental education*. Routledge, United Kingdom.
- Stanišić, J. and Maksić, S. (2014) 'Environmental education in Serbian primary schools: Challenges and changes in curriculum, pedagogy, and teacher training', *The Journal of Environmental Education*, 45, pp.118-131.
- Statistical Year Book ,national center for statically information , (2017). Oman: National Association for Statically Information.

- Steg, L. and de Groot, J.I., 2012. Environmental values. In *The Oxford handbook of environmental and conservation psychology*. Oxford Press, London, United Kingdom.
- Steg, L., Bolderdijk, J.W., Keizer, K. and Perlaviciute, G. (2014) 'An integrated framework for encouraging pro-environmental behaviour: The role of values, situational factors and goals', *Journal of Environmental Psychology*, 38, pp.104-115.
- Steg, L. and Vlek, C. (2009) 'Encouraging pro-environmental behaviour: An integrative review and research agenda', *Journal of Environmental Psychology*, 29, pp.309-317.
- Steinmetz, H., Knappstein, M., Ajzen, I., Schmidt, P. and Kabst, R. (2016) 'How effective are behavior change interventions based on the theory of planned behavior?', *Zeitschrift für Psychologie*. 224 (3), pp. 216-233.
- Stern, P.C. (2000), "Toward a coherent theory of environmentally significant behavior", *Journal of Social Issues*, Vol. 56 No. 3, pp. 407-424.
- Stevenson, R.B., Lasen, M., Ferreira, J.A. and Davis, J., (2017) 'Approaches to embedding sustainability in teacher education: A synthesis of the literature', *Teaching and Teacher Education*, 63, pp.405-417.
- Stevenson, R.B. (2007a) 'Schooling and environmental education: Contradictions in purpose and practice', *Environmental Education Research*, 13, pp.139-153.
- Stevenson, R.B. (2007b) 'Schooling and environmental/sustainability education: From discourses of policy and practice to discourses of professional learning', *Environmental Education Research*, 13, pp.265-285.
- Stokes, E., Edge, A. and West, A., (2001) 'Environmental education in the educational systems of the European Union', *Environment Directorate-General, European Commission*. London, United Kingdom.

- Subedi, D. (2016). Explanatory sequential mixed method design as the third research community of knowledge claim. *American Journal of Educational Research*, 4(7), 570-577.
- Taber, K.S. (2018) 'The use of Cronbach's alpha when developing and reporting research instruments in science education', *Research in Science Education*, 48(6), pp.1273-1296.
- Tal, T. and Alkaher, I. (2010) 'Collaborative environmental projects in a multicultural society: working from within separate or mutual landscapes?', *Cultural Studies of Science Education*, 5, pp.325-349.
- Taylor, S.J., Bogdan, R. and DeVault, M. (2015) *Introduction to qualitative research methods: A guidebook and resource*. John Wiley & Sons. Canada
- Teddlie, C. and Tashakkori, A. (2003) 'Major issues and controversies in the use of mixed methods in the social and behavioral sciences' In Tashakkori, A., & C. Teddlie (Eds.), *Handbook of Mixed Methods in Social and Behavioral Research*. Thousand Oaks, CA: Sage Publications.
- Teddlie, C. and Tashakkori, A. (2009). *Foundations of Mixed Methods Research*. Thousand Oaks, CA: Sage Publications.
- Tedeschi, J.T. (2017) *The social influence processes*. Routledge. New York, USA.
- Terrell, S.R., 2012. Mixed-methods research methodologies. *The qualitative report*, 17(1), pp.254-280.
- Thompson, B., 2004. *Exploratory and confirmatory factor analysis: Understanding concepts and applications*. American Psychological Association. Washington, US

- Thomson, S. (2015) *What are the Sustainable Development Goals?* Available at: <https://www.weforum.org/agenda/2015/09/what-are-the-sustainable-development-goals/> Accessed: 22 March(2019)
- Tilbury, D., Coleman, V. and Garlick, D., 2005. *A national review of environmental education and its contribution to sustainability in Australia: School education*. Department of the Environment and Heritage.
- Toner, K., Gan, M. and Leary, M.R. (2014) 'The impact of individual and group feedback on environmental intentions and self-beliefs', *Environment and Behavior*, 46(1), pp.24-45.
- Turgut, H. (2008) 'Prospective science teachers' conceptualizations about project based learning', *International Journal of Instruction*, 1, pp.61-79.
- UNESCO Country Strategy for the Sultanate of Oman 2019-2023. (2018). Available on www.unesco.org. (Accessed: 20 Feb (2019)).
- Valinas, M.A.G., Pérez, M.A.M. and Ferrera, J.M.C., (2010). The role of schools in providing environmental knowledge in science. *Investigaciones de Economía de la Educación volume 5*, 5, pp.87-100.
- Vicente-Molina, M.A., Fernández-Sáinz, A. and Izagirre-Olaizola, J. (2013). 'Environmental knowledge and other variables affecting pro-environmental behaviour: comparison of university students from emerging and advanced countries', *Journal of Cleaner Production*, 61, pp.130-138.
- Van der Werff, E., Steg, L. and Keizer, K. (2013) 'The value of environmental self-identity: The relationship between biospheric values, environmental self-identity and environmental preferences, intentions and behaviour', *Journal of Environmental Psychology*, 34, pp.55-63.
- Walliman, N. (2017). *Research methods: The basics*. Routledge. London, United Kingdom.

- Wang, P., Liu, Q. and Qi, Y., 2014. Factors influencing sustainable consumption behaviors: a survey of the rural residents in China. *Journal of Cleaner Production*, 63, pp.152-165.
- WHO (2019) *Millennium Development Goals (MDGs)* Available at: https://www.who.int/topics/millennium_development_goals/about/en/ Accessed: 22 May (2019).
- Wiseman, A.W., Alromi, N.H. and Alshumrani, S.A. (Eds.) (2014) *Education for a knowledge society in Arabian Gulf countries*. Emerald Group Publishing. Bingley
- Wong, C.A., Afandi, S.H.M., Ramachandran, S., Kunasekaran, P. and Chan, J.K.L. (2018) 'Conceptualizing environmental literacy and factors affecting pro-environmental behaviour', *International Journal of Business and Society*, 19(S1), pp.128-139.
- World Bank (2013) *Education in Oman: the drive for quality* (Vol. 2): Main report (English). Washington DC: WorldBank. Available at: <http://documents.worldbank.org/curated/en/280091468098656732/Main-report>. Accessed: 02 April (2019).
- Murphy, T and Olson, A (2008) *The Third Minnesota Report Card on Environmental Literacy* Available at <https://www.pca.state.mn.us/sites/default/files/p-ee5-07.pdf>. Accessed: 28 Jan 2018).
- Yin, R.K (2014) *Case study research: Design and methods*. Sage Publication. London, Uk.
- Yong, A.G. and Pearce, S., 2013. A beginner's guide to factor analysis: Focusing on exploratory factor analysis. *Tutorials in quantitative methods for psychology*, 9(2), pp.79-94.
- Zafar, S. (2016) 'Solid waste management in Oman', *EcoMENA*. Available at: <http://www.ecomena.org/solid-waste-oman/>. (Accessed: 31 Mar 2017).
- Zafar, S. (2019) 'Why education should be directed towards environmental protection' *EcoMena Knowledge Bank*. 20 January, 2019 Available at:

<https://www.ecomena.org/education-environmental-protection/> (Accessed 20 Jul 2019).

Zilahy, G. and Huisingh, D. (2009) 'The roles of academia in regional sustainability initiatives', *Journal of Cleaner Production*, 17, pp.1057-1066.

Appendices

Appendix A: approval letter from Ministry of Education to conduct the research instruments at Omani schools

Sultanate of Oman
Ministry of Education
Directorate General of Education Muscat Reg.

سلطنة عُمان
وزارة التربية والتعليم
دائرة تنمية الموارد البشرية

الرقم: م ع ت م ١١٩
التاريخ: ١٤٣٩/٧/٢٤ هـ
الموافق: ٢٠١٨/٤/١١ م

الأفاضل / مديرو ومديرات المدارس
المحترمون

السلام عليكم ورحمة الله وبركاته

الموضوع: تسهيل مهمة الباحثة / هناء بنت مرهون بن سالم البلوشية

بالإشارة للموضوع أعلاه ، أود افادتكم بأن الفاضلة / هناء بنت مرهون بن سالم البلوشية ، طالبة دكتوراة في جامعة (Northumbria) تخصص تطوير المناهج تقوم حاليا بإعداد دراسة بعنوان "التعليم البيئي في سلطنة عمان: دراسة العوامل التي تحدد المواقف والسلوكيات البيئية التي يعبر عنها الطلبة بخصوص قضايا البيئة" وترغب الباحثة في تطبيق أدوات الدراسة على عينة من الطلاب والمعلمين والإداريين .

عليه يرجى التكرم بتسهيل مهمة الباحثة وذلك وفق الإجراءات المعمول بها لديكم .

شاكرين لكم حسن تعاونكم
وتفضلوا بقبول فائق التقدير والاحترام

مدير دائرة تنمية الموارد البشرية

سلطنة عمان
وزارة التربية والتعليم
دائرة تنمية الموارد البشرية
مركز التدريب والتطوير

Appendix B: Schools' approval letters for conducting the research

Date ٢٠/٠٨/٢٠١٧

To

Head of School
Sultanate of Oman

Permission to Conduct Research Study

Dear Mr,

I am writing to request permission to conduct a research study at your school. I am currently enrolled in Post Graduate Programme (PH. D) at Northumbria University in Newcastle. I am in the process of writing my (PHD Thesis). The study is entitled: Environmental Education in Oman: Exploring the factors determining students' self-reported Environmental attitudes and behaviour toward Environmental Issues.

I hope that the school administration will allow me to recruit ٤٠ students (boys) aged between ١٥ and ١٨ from the school to anonymously complete a ٢١ items questionnaire (copy enclosed). Interested students, who volunteer to participate will be given consent forms to be signed and returned to the primary researcher (copy enclosed).

If approval is granted, student participants will complete the survey in a classroom or other quiet setting on the school site. The Survey will take place in November ١٥ to ١٥ of December. ٢٠١٧ during school time between ٩ am to ١٢pm. The survey process should take no longer than ٤٠ minutes. The survey results will be pooled for the thesis project and individual results of this study will remain confidential and anonymous. Should this study be published, only pooled results will be documented. No costs will be incurred by either your school or the individual participants.

Your approval to conduct this study will be greatly appreciated. I will follow up with a telephone call next week and would be happy to answer any questions or concerns that you may have at that time. You may contact me at my email address: hana.m.s.a.balushi@northumbria.ac.uk

If you agree, kindly sign below and return the signed form in the enclosed self-addressed envelope. Alternatively, kindly submit a signed letter of permission on

your institution's letterhead acknowledging your consent and permission for me to conduct this survey/study at your institution.

Sincerely,

Hana AL-Balushi

Northumbria University

Approved by:

Head of School

Name: *Mohammed Alsiaby.*

Schools' Name: *Alshikha Hamdan Al Fousey.*

Signature:

Email: *rawia0930@HotMail.com*

Date: *28/8/2017*



Date ٢٠/٠٨/٢٠١٧

To

Head of School
Sultanate of Oman

Permission to Conduct Research Study

Dear Mr,

I am writing to request permission to conduct a research study at your school. I am currently enrolled in Post Graduate Programme (PH. D) at Northumbria University in Newcastle. I am in the process of writing my (PHD Thesis). The study is entitled: Environmental Education in Oman: Exploring the factors determining students' self-reported Environmental attitudes and behaviour toward Environmental Issues.

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If you agree, kindly sign below and return the signed form in the enclosed self-addressed envelope. Alternatively, kindly submit a signed letter of permission on

your institution's letterhead acknowledging your consent and permission for me to conduct this survey/study at your institution.

Sincerely,

Hana AL-Balushi

Northumbria University

Approved by:

Head of School *Sheikha Abdullah Al-Jeleil*

Name:

Schools' Name: *Hail Alawameh*

Signature: *[Signature]*

Email:

Date: *28-8-2017*



Date ٢٠/٠٨/٢٠١٧

To

Head of School
Sultanate of Oman

Permission to Conduct Research Study

Dear Mr,

I am writing to request permission to conduct a research study at your school. I am currently enrolled in Post Graduate Programme (PH. D) at Northumbria University in Newcastle. I am in the process of writing my (PHD Thesis). The study is entitled: Environmental Education in Oman: Exploring the factors determining students' self-reported Environmental attitudes and behaviour toward Environmental Issues.

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If you agree, kindly sign below and return the signed form in the enclosed self-addressed envelope. Alternatively, kindly submit a signed letter of permission on

your institution's letterhead acknowledging your consent and permission for me to conduct this survey/study at your institution.

Sincerely,

Hana AL-Balushi

Northumbria University

Approved by:

Head of School

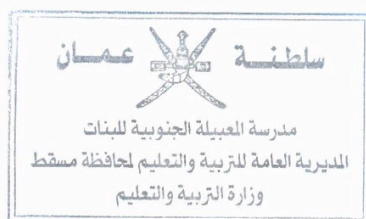
Name: *Zayana Saif Saeed*

Schools' Name: *Mabela School*

Signature: *[Handwritten Signature]*

Email: *Zayoon1111@hotmail.com*

Date: *23/8/2017*



Date ٢٠/٠٨/٢٠١٧

To

Head of School
Sultanate of Oman

Permission to Conduct Research Study

Dear Mr,

I am writing to request permission to conduct a research study at your school. I am currently enrolled in Post Graduate Programme (PH. D) at Northumbria University in Newcastle. I am in the process of writing my (PHD Thesis). The study is entitled: Environmental Education in Oman: Exploring the factors determining students' self-reported Environmental attitudes and behaviour toward Environmental Issues.

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If you agree, kindly sign below and return the signed form in the enclosed self-addressed envelope. Alternatively, kindly submit a signed letter of permission on

your institution's letterhead acknowledging your consent and permission for me to conduct this survey/study at your institution.

Sincerely,

Hana AL-Balushi

Northumbria University

Approved by:

Head of School

Name:

Hamood Saoud Hamad Al-shaily

Schools' Name:

Al-Hassan Bin Hakeem Post basic School

Signature:

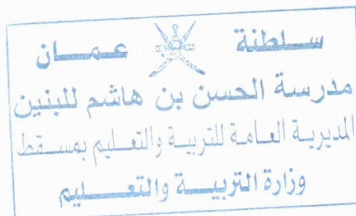


Email:

hamood.1@moe.om

Date:

22/8/2017



Appendix C: Questionnaire Pilot

Participant 1

استقصاء المواقف والمعارف والسلوكيات البيئية للطلبة العُمانيين

عنوان الدراسة: التعليم البيئي في سلطنة عُمان: دراسة العوامل التي تحدد المواقف والسلوكيات البيئية التي يعبر عنها الطلبة بخصوص قضايا البيئة

هناء البلوشي
جامعة نورثومبريا في نيوكاسل

عزيزي المشارك،

اسمي هو هناء البلوشي وأنا طالبة دكتوراة في جامعة نورثومبريا في نيوكاسل في المملكة المتحدة. وهذا الاستبيان هو جزء من دراسة بحثية حول المواقف والسلوكيات البيئية لطلبة المدارس تجاه قضايا البيئة داخل سلطنة عُمان. تُنفذ هذه الدراسة البحثية كجزء من مقرراتي الجامعية (بحث الدكتوراة) وستكون نتائج هذا البحث مفيدة في تحسين التخطيط البيئي في سلطنة عُمان. تبحث هذه الدراسة في العوامل التي تحدد المواقف والسلوكيات البيئية التي يعبر عنها الطلبة تجاه قضايا البيئة. وبما أنك طالب عُماني تدرس في مدرسة حكومية عُمانية ويتراوح عمرك بين الخامسة عشرة والثامنة عشرة بالإضافة إلى إظهارك الاهتمام بالمشاركة في هذه الدراسة، فإنني أدعوك للمشاركة في هذه الدراسة البحثية من خلال إكمال الاستقصاء المرفق. لا تتردد في تعبئة الاستبيان لأنه سيتم التعامل مع المعلومات المقدمة بسرية تامة.

يستغرق الاستبيان الآتي حوالي 30-45 دقيقة لإكماله. ولا يوجد أي مقابل مادي للإجابة على أسئلة الاستبيان كما لا توجد أي مخاطرة في ذلك. ولضمان بقاء جميع المعلومات سرية، يرجى عدم إدراجك اسمك في الاستبيان. وإذا قررت المشاركة في هذا الاستقصاء، يرجى الإجابة على جميع الأسئلة بأقصى أمانة ممكنة وتقديم الاستبيان إلى الباحث باليد. تعتبر المشاركة في هذا الاستبيان طوعية تمامًا ويجوز لك رفض المشاركة في أي وقت. أشكرك على الوقت الذي قدمته لمساعدتي في جهودي التعليمية. وإذا أردت الحصول على نسخة موجزة من هذه الدراسة، يرجى إكمال وفصل استمارة طلب المعلومات وتقديمها لي باليد في مطروف منفصل. إن إكمال الاستبيان وإعادة توضح رغبتك في المشاركة في هذه الدراسة. وفي حالة حاجتك إلى معلومات إضافية أو كانت لديك أسئلة، يرجى التواصل معي عن طريق البريد الإلكتروني الوارد أدناه.

خالص التحية،

هناء البلوشي

البريد الإلكتروني للباحثة: hanaalbalushi@moe.om

hana.m.s.a.balushi@northumbria.ac.uk

طلب المعلومات:

يرجى إرسال صورة من نتائج الدراسة على العنوان الوارد أدناه

الاسم:

العنوان:

استقصاء المواقف والمعارف والسلوكيات البيئية للطلبة العُمانيين

يرجى وضع دائرة على الإجابة المناسبة

1. السن

20-15 سنة	✓	21-25 سنة	26-30 سنة	أكثر من 30 سنة
-----------	---	-----------	-----------	----------------

2. النوع

ذكر	أنثى
	✓

3. اسم المدرسة

المجيلة الجنوبية للتعليم ما بعد الاساسي

4. المستوى التعليمي

الصف العاشر	الصف الحادي عشر	الصف الثاني عشر
		✓

5. مكان المسكن

الريف	المدينة
	✓

6. كم عدد المرات التي تباشر فيها السلوكيات الداعمة للبيئة الآتية في حياتك اليومية؟

السلوكيات البيئية	كل يوم	مرة في الأسبوع	مرة في الشهر	نادرًا	أخرى (يرجى التحديد)
أ. إعادة تدوير الأشياء مثل الصحف، والعلب، والزجاج				✓	
ب. إعادة استخدام الأكياس أو البرطمانات			✓		
ج. إطفاء الأنوار والأجهزة الكهربائية في حالة عدم استخدامها أو عندما تغادر الغرفة	✓				
د. محاولة عدم إسقاط القمامة	✓				
هـ. ركوب الدراجة أو المشي للتنقل				✓	

و. استخدام المواصلات العامة للتنقل					✓
ز. مشاركة السيارة مع الآخرين				✓	
ح. شراء اللبسات، ومصابيح الإضاءة، والأجهزة الموفرة للطاقة					✓
ط. تشغيل مكيف الهواء بصورة أقل في الصيف					✓
ي. التبرع بالأموال سنوياً لمجموعة أو منظمة بيئية					✓
ك. شراء الأطعمة العضوية "الأورجانيك" بانتظام			✓		
ل. شراء التونة الصديقة للدلافين					✓
م. شراء الأطعمة المزروعة محلياً بانتظام				✓	

7. هل تشارك في أنشطة حماية البيئة مثل رمي النفايات، والتشجير، وإعادة التدوير؟ (ضع دائرة عند الاقتضاء)

1. نعم

2. لا

إذا كانت الإجابة بنعم، كم مرة شاركت في الأنشطة البيئية؟

(يرجى وضع علامة لتحديد عدد المرات)

كل يوم	مرة في الأسبوع	مرة في الشهر	نادرًا	أخرى (يرجى التحديد)

8. هل تشاهد البرامج التليفزيونية أو تقرأ مواد حول البيئة؟

(ضع دائرة للإجابة)

1. نعم

2. لا

أ. إذا كانت الإجابة بنعم، كم مرة شاهدت البرامج التلفزيونية أو قرأت مواد حول البيئة؟
(ضع علامة لتحديد عدد المرات)

عدد المرات	كل يوم	مرة في الأسبوع	مرة في الشهر	نادرًا	أخرى (يرجى التحديد)
		✓			

ب. يرجى إعطاء أمثلة حول ما قرأته أو شاهدته حول البيئة؟

- ناسيونال جيوغرافيك، "برنامج تلفزيوني"
- مقال عن استمرار المخلفات على الأسماك ونميرها عن الحيوانات البحرية.
- بعض الخطوات، الانواع التي يمكن أن توفر الطاقة وتقلل من التلوث

وضّح موافقتك أو عدم موافقتك على الأسئلة من 9 إلى 15 من خلال العبارات الآتية عن طريق وضع دائرة حول إجابتك باستخدام هذا المقياس:

1 2 3 4 5 6

أوافق بشدة أوافق أوافق إلى حد ما لا أوافق إلى حد ما لا أوافق لا أوافق بشدة

9. إلى أي مدى توافق على أن الوصول إلى التعليم البيئي له تأثير في تغيير مواقفك وسلوكياتك البيئية؟ (ضع دائرة حول إجابتك)

6	5	4	3	2	1
---	---	---	---	---	---

10. هل ترى أنه ينبغي تقديم التعليم البيئي في مدارسنا؟

6	5	4	3	2	1
---	---	---	---	---	---

11. هل ترى أن نقص برامج التعليم البيئي في المدارس هو السبب الرئيسي للسلوكيات غير الصديقة للبيئة؟

6	5	4	3	2	1
---	---	---	---	---	---

12. إلى أي مدى ترى أن مدرستك تبذل جهودًا كافية لتمكين الطلاب في التعليم البيئي؟

6	5	4	3	2	1
---	---	---	---	---	---

13. تصف البنود الآتية إفادات حول السلوكيات البيئية في أسلوب حياتك الفردي.

6	5	4	3	2	1	السلوك البيئي
6	5	4	3	2	1	أ. عندما امتلاك حرية الاختيار، فأبني اختر دائمًا المنتج الذي يسبب أقل قدر من الضرر البيئي.
6	5	4	3	2	1	ب. لقد استبدلت بعض المنتجات بغيرها لأسباب بيئية
6	5	4	3	2	1	ج. إذا فهمت الضرر المحتمل الذي يمكن أن تسببه بعض المنتجات للبيئة، فأبني لا أشتري تلك المنتجات.
6	5	4	3	2	1	د. أشتري المنتجات المعبنة في أوعية قابلة لإعادة الاستخدام أو قابلة لإعادة التدوير كلما أمكن ذلك.
6	5	4	3	2	1	هـ. دفعت أموال أكثر في شراء المنتجات الصديقة للبيئة عندما كان هناك بديل أرخص ثمناً.

14. إلى أي مدى توافق أو تعارض العبارات الآتية؟ (ضع دائرة حول إجابتك)

6	5	4	3	2	1	أ. تدعم رسالة مدرستنا الاستدامة البيئية
6	5	4	3	2	1	ب. يدعم منهج مدرستنا التعليم البيئي
6	5	4	3	2	1	ج. يمثل الحفاظ على البيئة أولوية بالنسبة لمدرستنا

15. أيًا من المواقف والسلوكيات الآتية تناسب رأيك حول قضايا البيئة؟ (ضع دائرة حول إجابتك)

6	5	4	3	2	1	أ. التلوث والتدهور البيئي يؤثر عليّ
6	5	4	3	2	1	ب. ينبغي على الحكومة فرض إجراءات صارمة للحد من التلوث
6	5	4	3	2	1	ج. أنا مؤيد كبير لإعادة تدوير وإعادة استخدام النفايات
6	5	4	3	2	1	د. أنا على استعداد للمشاركة بتوضيحات شخصية لوقف التلوث والتدهور البيئي

16. ما هي المصادر الرئيسية للمعلومات حول التعليم البيئي التي يمكنك الوصول إليها؟

مصدر المعلومات	ضع علامة لتحديد إجابتك	مصدر المعلومات	ضع علامة لتحديد إجابتك
الصحف	✓	المحادثات مع الأصدقاء أو الجيران	
الكتب	✓	الهيئات الحكومية (الهيئات في الولايات أو الهيئات الفيدرالية)	✓
المجلات		جماعات الحماية أو الجماعات البيئية	✓
وسائل التواصل الاجتماعي	✓	مراكز التعلم البيئي بما في ذلك مراكز الطبيعة، والحدائق، والعلوم	✓
ورش العمل	✓	خبراء العلوم	✓
المدرسة		أخرى	
الأسرة			

17. إذا أردت زيادة وعيك البيئي، ما هي الطريقة التي ستستخدمها؟ (اختر 3 طرق فقط).

الطريقة	ضع علامة	اذكر أمثلة
المناهج التعليمية في المدارس		
الراديو		
التلفزيون		
المجلات		
المؤتمرات والندوات	✓	مؤتمرات تتحدث عن البيئة والمحافظة عليها
المعارض		
المسابقات		
الحملة التعليمية		

18. أنا أعتبر نفسي على دراية كبيرة بقضايا البيئة (ضع علامة في المربع الصحيح)

أوافق بشدة	أوافق	لا أوافق ولا أعارض	لا أوافق بشدة
		✓	

للإجابة على الأسئلة الآتية من (19-22)، يرجى استخدام مقياس مكون من 5 نقاط حيث يقصد بالرقم 1 لا شيء على الإطلاق ويقصد بالرقم 5 كثيرا. يرجى وضع دائرة على الرقم المناسب من 1 إلى 5.

لا شيء على الإطلاق

كثيرا

1 —————> 5

19. برأيك، ما مقدار معرفتك بالمشاكل البيئية؟

5	4	3	✓ 2	1
---	---	---	-----	---

20. برأيك، ما مقدار معرفتك بتلوث الهواء؟

5	4	✓ 3	2	1
---	---	-----	---	---

21. برأيك، ما مقدار معرفتك بقضايا الطاقة؟

5	4	3	2	✓ 1
---	---	---	---	-----

22. برأيك، ما مقدار معرفتك بجودة المياه؟

5	4	3	2	1
---	---	---	---	---

يرجى وضع دائرة على الإجابة الصحيحة بالنسبة للأسئلة من 23-30.

23. يُعرّف الاحترار العالمي على أنه "زيادة في درجة حرارة الأرض تسببها أنشطة الإنسان والتي تُطلق ... غازات الدفيئة (الاحتباس الحراري) في الغلاف الجوي." أيًا مما يلي يعتبر من غازات الدفيئة المعروفة؟

1. ثاني أكسيد الكبريت
2. ثاني أكسيد الكربون
3. النيتروجين
4. الهيدروجين

24. جميع الأنشطة المدرجة هنا تعتبر من العوامل المساعدة في غازات الدفيئة التي يسببها الإنسان في سلطنة عُمان. أيًا مما يلي هو العامل المساعد الأكبر لانبعاثات غازات الدفيئة في سلطنة عُمان؟

1. العمليات الزراعية
2. التسرب الناتج عن أنظمة التبريد
3. احتراق الوقود الأحفوري (الفحم، والنفط، والغازولين، والديزل، والغاز الطبيعي)
4. الغازات المنبعثة من المرامم

25. ما هو السبب الأكثر شيوعًا وراء انقراض أي فصيلة حيوانية في سلطنة عُمان؟ هل لأن

1. المبيدات الحشرية تتسبب في قتلهم
2. البشر يدمرون موائلهم (مساكنهم)
3. الزيادة الكبيرة جدًا في الصيد
4. هناك تغيرات مناخية تؤثر عليهم

26. ما هي المنافع الرئيسية للأراضي الرطبة؟ هل هي ...

1. تساعد في الحد من التغير المناخي العالمي
2. تساعد في تنقية وتخزين المياه قبل دخولها إلى البحيرات أو الأنهار أو المحيطات
3. منع انتشار النباتات والحيوانات غير المرغوب فيها
4. توفير مواقع جيدة للمرامم

27. أين تذهب معظم القمامة في سلطنة عُمان؟ هل ستقول إلى ...

1. المرامم
2. محطات ترميد النفايات إلى الطاقة
3. براميل الحرق
4. مراكز إعادة التدوير
5. منشآت التسميد

28. بالنسبة لسلطنة عُمان، أيًا من الاستخدامات الآتية هو الذي يستخدم معظم الطاقة في المنازل؟ هل هي...

1. إنارة الغرف
2. تدفئة الغرف
3. تبريد الغرف
4. تسخين المياه
5. تجميد الأطعمة

29. خلال السنوات العشر الماضية، هل أن كفاءة وقود المركبات في سلطنة عُمان

1. ارتفعت
2. ظلت كما هي
3. انخفضت
4. لم يتم متابعتها

30. أيًا مما يلي حسب رأي خبراء الطاقة تعتبر الطريقة الأكثر من حيث السرعة وفعالية التكلفة لمعالجة جميع احتياجاتنا من الطاقة؟ هل تعتقد أنه

1. تطوير جميع المصادر المحلية المتاحة للنفط والغاز
2. بناء المزيد من محطات الطاقة النووية
3. بناء المزيد من محطات الطاقة الكهرومائية
4. أن يصبح أكثر كفاءة في استخدام الطاقة؟

QUESTIONNAIRE

The questionnaire is part of a study on environmental attitudes and behaviours towards environmental issues within the sultanate of Oman. The study is part of my university (Post Graduate Research) coursework and the findings will be useful in improving environmental planning in Oman. **Feel free to fill in the Questionnaire willingly as the information provided will be treated with outmost confidentiality.** You may decline to participate as you wish without any consequences.

1. Age (Tick the correct box)

15-20 yrs.	21-25 yrs.	26-30 yrs.	Above 30 yrs.
✓			

2. Gender

Male	Female
	✓

3. School Name

Mabeela Al Janobia for girls

4. Education level

Grade10	Grade11	Grade12
		✓

5. Location of household

Rural setting	Urban setting

6. How often do you do the following pro-environmental behaviours in your day-to-day life?

Environmental Behaviours	Everyday	Once a week	Once a month	rarely	Other (please specify)
A. Recycle things such as newspapers, cans, and glass				✓	
B. Re-use bags or jars		✓			
C. Turn off lights and electrical appliances when not in use or when you leave the room	✓				
D. Try not to drop litter	✓				
E. Bike or walk to work				✓	
F. Use the bus				✓	
G. Carpool with others		✓			
H. Purchase lamps, light-bulbs and appliances that are energy efficient			✓		
I. Run air conditioner less often in the summer				✓	
J. Donate money annually to an environmental group or organization		✓			
K. Buy organic foods on a regular basis				✓	
L. Buy dolphin friendly tuna			✓		
M. Buy locally-grown foods on a regular basis		✓			

7. Do you participate in environmental protection activities e.g. Littering, planting, recycling? (Tick where applicable)

Everyday	Once a week	Once a month	Rarely	Other (Please specify)
			✓	

8. Do you watch TV programs or read material about the environment?

Everyday	Once a week	Once a month	Rarely	Other (Please specify)
	✓			

9. To what extent do you Agree that access to environmental education has an impact in changing your environmental attitudes and behaviours? (Tick where appropriate)

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
	✓			

10. Do you think environmental education should be provided in our schools?

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
✓				

11. Do you think Lack of environmental education programs in schools is a major cause for environmental unfriendly behaviours?

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
		✓		

12. To what extent do you believe that your school is doing enough to empower students on environmental education?

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
✓				

13. To what extent do you agree or disagree with the following pro-environmental behaviours in your individual lifestyle?(product means

Environmental Behaviour	Strongly agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
A. When there is a choice, I always choose the product that contributes to the least amount of environmental damage.			✓		
B. I have switched products for environmental reasons.		✓			
C. If I understand the potential damage to the environment that some products can cause, I do not purchase those products.	✓				
D. Whenever possible, I buy products packaged in reusable or recyclable containers.			✓		
E. I have paid more for environmentally friendly products when there is a cheaper alternative.			✓		

14. To what extent do you agree or disagree with the following statements? (Tick where appropriate)

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
A. Our school mission supports environmental sustainability		<input checked="" type="checkbox"/>			
B. Our school curriculum is supportive of environmental education		<input checked="" type="checkbox"/>			
C. Environmental conservation is priority to our school			<input checked="" type="checkbox"/>		

15. Which of the following attitudes and behaviours best suit your opinion on environmental issues? (Tick where applicable)

	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
A. Environmental pollution and degradation affects me	<input checked="" type="checkbox"/>				
B. The government should introduce harsh measure to curb pollution		<input checked="" type="checkbox"/>			
C. I am big champion of recycling and re-use of waste			<input checked="" type="checkbox"/>		
D. I would be willing to engage in personal sacrifices to stop environmental pollution and degradation	<input checked="" type="checkbox"/>				

16. What are major sources of information on environmental education accessible to you?

Information source	Tick where appropriate	Information source	Tick where appropriate
Newspapers		Conversations with friends or neighbours	✓
Books	✓	Government agencies (STATE OR FEDERAL)	
Journals		Conservation or Environmental Groups	✓
Social Media	✓	Environmental learning centres, including nature centres, parks, science	
Workshops		Scientific experts	
School	✓	Other	
Family	✓		

17. If you would like to increase your environmental awareness, what method would you use? (Choose 3 only).

Method	Provide Examples
Education curricula at schools	✓
Radio	
Television	✓
Magazines	
Conferences and seminars	
Exhibitions	
Competitions	✓
Education campaigns	

18. I consider myself highly knowledgeable about Environmental issues (Tick the correct Box)

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
	✓			

To answer the following questions, please use a 5-point scale where **1** means **a lot** and **5** means **Nothing** at all. You may use any number from 1 to 5.

A lot **nothing at all**



19. How much would you say you know about Environmental problems? (tick the box)

1	2	3	4	5
		✓		

20. How much would you say you know about Air pollution? (tick the box)

1	2	3	4	5
	✓			

21. How much would you say you know about Energy issues? (tick the box)

1	2	3	4	5
	✓			

22. How much would you say you know about Water quality? (tick the box)

1	2	3	4	5
		✓		

23. Global warming defined as “an increase in the Earth’s temperature caused by human activities.... Which release...greenhouse gases into the atmosphere.” Which of the following is a common greenhouse gas? [circle the correct answer]

1. Sulfur dioxide
- ② Carbon dioxide
3. Nitrogen or
4. Hydrogen

24. All the activities listed here are contributors of human-caused greenhouse gases in Oman. Which of the following is the LARGEST contributor to greenhouse gas emissions in Oman? [circle the correct answer]

1. Agricultural operations
2. Leakage from refrigeration systems
- ③ Burning fossil fuels (COAL, OIL, GASOLINE, DIESEL AND NATURAL GAS), or
4. Gases released from landfills

25. What is the MOST common reason that an animal species becomes extinct? Is it because....

[circle the correct answer]

1. Pesticides are killing them
2. Their habitats are being destroyed by humans
- ③ There is too much hunting, or
4. There are climate changes that affect them

26. What is one of the MAIN benefits of wetlands? Do they... [circle the correct answer]

- ① Help to control global climate change
2. Help filter and store water before it enters lakes, streams, rivers or oceans
3. Prevent the spread of undesirable plants and animals, or
4. Provide good sites for landfills

27. Where does MOST of the garbage in Oman go? Would you say... [circle the correct answer]

1. Landfills
2. Waste to energy incinerators
- ③ Burn barrels
4. Recycling centres
5. Compost facilities

28. Thinking about Oman, which of the following uses the most energy in people's homes? Is it... [circle the correct answer]

1. Lighting rooms
2. Heating rooms
3. Cooling rooms,
4. Heating water, or
5. Refrigerating food

29. In the past ten years, has the fuel efficiency of vehicles in Oman [circle the correct answer]

1. Increased
2. Remained the same
3. Decreased
4. Not been tracked

30. Which of the following do you think energy experts say is the fastest and most cost-effective way to address our overall energy needs? Would you say [circle the correct answer]

1. Develop all possible domestic sources of oil and gas
2. Build more nuclear power plants
3. Build more hydroelectric power plants, or
4. Become more energy efficient?

Appendix D: Questionnaire Form in Arabic Language

استقصاء المواقف والمعارف والسلوكيات البيئية للطلبة العُمانيين

عنوان الدراسة: التعليم البيئي في سلطنة عُمان: دراسة العوامل التي تحدد المواقف والسلوكيات البيئية التي يعبر عنها الطلبة بخصوص قضايا البيئة

هناء البلوشي
جامعة نورثومبريا في نيوكاسل

التاريخ: 10/10/2017 :

عزيزي المشارك،

اسمي هو هناء البلوشي وأنا طالبة دكتوراة في جامعة نورثومبريا في نيوكاسل في المملكة المتحدة. وهذا الاستبيان هو جزء من دراسة بحثية حول المواقف والسلوكيات البيئية لطلبة المدارس تجاه قضايا البيئة داخل سلطنة عُمان. تُنفذ هذه الدراسة البحثية كجزء من مقرراتي الجامعية (بحث الدكتوراة) وستكون نتائج هذا البحث مفيدة في تحسين التخطيط البيئي في سلطنة عُمان. تبحث هذه الدراسة في العوامل التي تحدد المواقف والسلوكيات البيئية التي يعبر عنها الطلبة تجاه قضايا البيئة. وبما أنك طالب عُماني تدرس في مدرسة حكومية عُمانية ويتراوح عمرك بين الخامسة عشرة والثامنة عشرة بالإضافة إلى إظهارك الاهتمام بالمشاركة في هذه الدراسة، فإنني أدعوك للمشاركة في هذه الدراسة البحثية من خلال إكمال الاستقصاء المرفق. لا تتردد في تعبئة الاستبيان لأنه سيتم التعامل مع المعلومات المقدّمة بسرية تامة.

يستغرق الاستبيان الآتي حوالي 30-45 دقيقة لإكماله. ولا يوجد أي مقابل مادي للإجابة على أسئلة الاستبيان كما لا توجد أي مخاطرة في ذلك. ولضمان بقاء جميع المعلومات سرية، يرجى عدم إدراج اسمك في الاستبيان. وإذا قررت المشاركة في هذا الاستقصاء، يرجى الإجابة على جميع الأسئلة بأقصى أمانة ممكنة وتقديم الاستبيان إلى الباحث باليد. تعتبر المشاركة في هذا الاستبيان طوعية تمامًا ويجوز لك رفض المشاركة في أي وقت.

أشكرك على الوقت الذي قدمته لمساعدتي في جهودي التعليمية. وإذا أردت الحصول على نسخة موجزة من هذه الدراسة، يرجى إكمال وفصل استمارة طلب المعلومات وتقديمها لي باليد في مظهر منفصل. إن إكمال الاستبيان

وإعادته توضح رغبتك في المشاركة في هذه الدراسة. وفي حالة حاجتك إلى معلومات إضافية أو كانت لديك أسئلة، يرجى التواصل معي عن طريق البريد الإلكتروني الوارد أدناه.

خالص التحية،

هناك البلوشي

hanaalbalushi@moe.om البريد الإلكتروني للباحثة:

hana.m.s.a.balushi@northumbria.ac.uk

طلب المعلومات:

يرجى إرسال صورة من نتائج الدراسة على العنوان الوارد أدناه

الاسم:

العنوان:

استقصاء المواقف والمعارف والسلوكيات البيئية للطلبة العُمانيين

يرجى وضع دائرة على الإجابة المناسبة

1. السن

15 سنة	16 سنة	17 سنة	18 سنة
--------	--------	--------	--------

2. النوع

ذكر	أنثى
-----	------

3. اسم المدرسة

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4. المستوى التعليمي

الصف العاشر	الصف الحادي عشر	الصف الثاني عشر
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5. مكان المسكن

الريف	المدينة
-------	---------

6. كم عدد المرات التي تبأشر فيها السلوكيات الداعمة للبيئة الآتية في حياتك اليومية؟

السلوكيات البيئية	كل يوم	مرة في الأسبوع	مرة في الشهر	نادرًا	أخرى (يرجى التحديد)
إعادة تدوير الأشياء مثل الصحف، والعلب، والزجاج					
إعادة استخدام الأكياس أو البرطمانات					
إطفاء الأنوار والأجهزة الكهربائية في حالة عدم استخدامها أو عندما تغادر الغرفة					
محاولة عدم إسقاط القمامة					
ركوب الدراجة أو المشي للتنقل					
استخدام المواصلات العامة للتنقل					
مشاركة السيارة مع الآخرين					
شراء اللمبات، ومصابيح الإضاءة، والأجهزة الموفرة للطاقة					
تشغيل مكيف الهواء بصورة أقل في الصيف					
التبرع بالأموال سنويًا لمجموعة أو منظمة بيئية					
شراء الأطعمة العضوية "الأورجانيك" بانتظام					
شراء التونة الصديقة للدلافين					
شراء الأطعمة المزروعة محليًا بانتظام					

7. هل تشارك في أنشطة حماية البيئة مثل رمي النفايات، والتشجير، وإعادة التدوير؟ (ضع دائرة عند الاقتضاء)

1. نعم

2. لا

إذا كانت الإجابة بنعم، كم مرة شاركت في الأنشطة البيئية؟

(يرجى وضع علامة لتحديد عدد المرات)

كل يوم	مرة في الأسبوع	مرة في الشهر	نادرًا	أخرى (يرجى التحديد)

8. هل تشاهد البرامج التليفزيونية أو تقرأ مواد حول البيئة؟

(ضع دائرة للإجابة)

1. نعم

2. لا

أ.

إذا كانت الإجابة بنعم، كم مرة شاهدت البرامج التليفزيونية أو قرأت مواد حول البيئة؟

(ضع علامة لتحديد عدد المرات)

عدد المرات	كل يوم	مرة في الأسبوع	مرة في الشهر	نادرًا	أخرى (يرجى التحديد)

ب. يرجى إعطاء أمثلة حول ما قرأته أو شاهدته حول البيئة؟

وضّح موافقتك أو عدم موافقتك على الأسئلة من 9 إلى 15 من خلال العبارات الآتية عن طريق وضع دائرة حول إجابتك باستخدام هذا المقياس:

1	2	3	4	5	6
أوافق بشدة	أوافق	أوافق إلى حد ما	لا أوافق إلى حد ما	لا أوافق	لا أوافق بشدة

9. إلى أي مدى توافق على أن الوصول إلى التعليم البيئي له تأثير في تغيير مواقفك وسلوكياتك البيئية؟ (ضع دائرة حول إجابتك)

1	2	3	4	5	6
---	---	---	---	---	---

10. هل ترى أنه ينبغي تقديم التعليم البيئي في مدارسنا؟

1	2	3	4	5	6
---	---	---	---	---	---

11. هل ترى أن نقص برامج التعليم البيئي في المدارس هو السبب الرئيسي للسلوكيات غير الصديقة للبيئة؟

1	2	3	4	5	6
---	---	---	---	---	---

12. إلى أي مدى ترى أن مدرستك تبذل جهودًا كافية لتمكين الطلاب في التعليم البيئي؟

1	2	3	4	5	6
---	---	---	---	---	---

13. تصف البنود الآتية إفادات حول السلوكيات البيئية في أسلوب حياتك الفردي.

السلوك البيئي	1	2	3	4	5	6
عندما أمتلك حرية الاختيار، فإنني أختار دائمًا المنتج الذي يسبب أقل قدر من الضرر البيئي.	1	2	3	4	5	6
لقد استبدلت بعض المنتجات بغيرها لأسباب بيئية	1	2	3	4	5	6
إذا فهمت الضرر المحتمل الذي يمكن أن تسببه بعض المنتجات للبيئة، فإنني لا أشتري تلك المنتجات.	1	2	3	4	5	6
أشتري المنتجات المعبئة في أوعية قابلة لإعادة الاستخدام أو قابلة لإعادة التدوير كلما أمكن ذلك.	1	2	3	4	5	6
دفعت أموال أكثر في شراء المنتجات الصديقة للبيئة عندما كان هناك بديل أرخص ثمنًا.	1	2	3	4	5	6

14. إلى أي مدى توافق أو تعارض العبارات الآتية؟ (ضع دائرة حول إجابتك)

6	5	4	3	2	1	تدعم رسالة مدرستنا الاستدامة البيئية
6	5	4	3	2	1	يدعم منهج مدرستنا التعليم البيئي
6	5	4	3	2	1	يمثل الحفاظ على البيئة أولوية بالنسبة لمدرستنا

15. أيًا من المواقف والسلوكيات الآتية تناسب رأيك حول قضايا البيئة؟ (ضع دائرة حول إجابتك)

6	5	4	3	2	1	التلوث والتدهور البيئي يؤثر عليّ
6	5	4	3	2	1	ينبغي على الحكومة فرض إجراءات صارمة للحد من التلوث
6	5	4	3	2	1	أنا مؤيد كبير لإعادة تدوير وإعادة استخدام النفايات
6	5	4	3	2	1	أنا على استعداد للمشاركة بتضحيات شخصية لوقف التلوث والتدهور البيئي

16. ما هي المصادر الرئيسية للمعلومات حول التعليم البيئي التي يمكنك الوصول إليها؟

مصدر المعلومات	ضع علامة لتحديد إجابتك	مصدر المعلومات	ضع علامة لتحديد إجابتك
الصحف		المحادثات مع الأصدقاء أو الجيران	
الكتب		الهيئات الحكومية (الهيئات في الولايات أو الهيئات الفيدرالية)	

المجالات	جماعات الحماية أو الجماعات البيئية	
وسائل التواصل الاجتماعي	مراكز التعلم البيئي بما في ذلك مراكز الطبيعة، والحدائق، والعلوم	
ورش العمل	خبراء العلوم	
المدرسة	أخرى	
الأسرة		

17. إذا أردت زيادة وعيك البيئي، ما هي الطريقة التي ستستخدمها؟ (اختر 3 طرق فقط).

الطريقة	ضع علامة	اذكر أمثلة
المناهج التعليمية في المدارس		
الراديو		
التلفزيون		
المجلات		
المؤتمرات والندوات		
المعارض		
المسابقات		
الحملات التعليمية		

18. أنا أعتبر نفسي على دراية كبيرة بقضايا البيئة (ضع علامة في المربع الصحيح)

أوافق بشدة	أوافق	لا أوافق ولا أعارض	لا أوافق بشدة

للإجابة على الأسئلة الآتية من (19-22)، يرجى استخدام مقياس مكون من 5 نقاط حيث يقصد بالرقم 1 لا شيء
على الإطلاق ويقصد بالرقم 5 كثيرًا . يرجى وضع دائرة على الرقم المناسب من 1 إلى 5.

لا شيء على

كثيرًا

الإطلاق

1

5

19. برأيك، ما مقدار معرفتك بالمشاكل البيئية؟

5	4	3	2	1
---	---	---	---	---

20. برأيك، ما مقدار معرفتك بتلوث الهواء؟

5	4	3	2	1
---	---	---	---	---

21. برأيك، ما مقدار معرفتك بقضايا الطاقة؟

5	4	3	2	1
---	---	---	---	---

22. برأيك، ما مقدار معرفتك بجودة المياه؟

5	4	3	2	1
---	---	---	---	---

يرجى وضع دائرة على الإجابة الصحيحة بالنسبة للأسئلة من 23-30.

23. يُعرّف الاحترار العالمي على أنه "زيادة في درجة حرارة الأرض تسببها أنشطة الإنسان والتي تُطلق ...

غازات الدفيئة (الاحتباس الحراري) في الغلاف الجوي." أيًا مما يلي يعتبر من غازات الدفيئة المعروفة؟

1. ثاني أكسيد الكبريت

2. ثاني أكسيد الكربون

3. النيتروجين

4. الهيدروجين

24. جميع الأنشطة المدرجة هنا تعتبر من العوامل المساعدة في غازات الدفيئة التي يسببها الإنسان في سلطنة عُمان.

أيًا مما يلي هو العامل المساعد الأكبر لانبعاثات غازات الدفيئة في سلطنة عُمان؟

1. العمليات الزراعية

2. التسرب الناتج عن أنظمة التبريد

3. احتراق الوقود الأحفوري (الفحم، والنفط، والغازولين، والديزل، والغاز الطبيعي)

4. الغازات المنبعثة من المرامم

25. ما هو السبب الأكثر شيوعًا وراء انقراض أي فصيلة حيوانية في سلطنة عُمان؟ هل لأن

1. المبيدات الحشرية تتسبب في قتلهم

2. البشر يدمرون موائلهم (مساكنهم)

3. الزيادة الكبيرة جدًا في الصيد

4. هناك تغيرات مناخية تؤثر عليهم

26. ما هي المنافع الرئيسية للأراضي الرطبة؟ هل هي ...

1. تساعد في الحد من التغير المناخي العالمي

2. تساعد في تنقية وتخزين المياه قبل دخولها إلى البحيرات أو الأنهار أو المحيطات

3. منع انتشار النباتات والحيوانات غير المرغوب فيها

4. توفير مواقع جيدة للمرادم

27. أين تذهب معظم القمامة في سلطنة عُمان؟ هل ستقول إلى ...

1. المرادم

2. محطات ترميد النفايات إلى الطاقة

3. براميل الحرق

4. مراكز إعادة التدوير

5. منشآت التسميد

28. بالنسبة لسلطنة عُمان، أيًا من الاستخدامات الآتية هو الذي يستخدم معظم الطاقة في المنازل؟ هل هي...

1. إنارة الغرف

2. تدفئة الغرف

3. تبريد الغرف

4. تسخين المياه

5. تجميد الأطعمة

29. خلال السنوات العشر الماضية، هل أن كفاءة وقود المركبات في سلطنة عُمان

1. ارتفعت

2. ظلت كما هي

3. انخفضت

4. لم يتم متابعتها

30. أياً مما يلي حسب رأي خبراء الطاقة تعتبر الطريقة الأكثر من حيث السرعة وفعالية التكلفة لمعالجة جميع احتياجاتنا

من الطاقة؟ هل تعتقد أنه

1. تطوير جميع المصادر المحلية المتاحة للنفط والغاز

2. بناء المزيد من محطات الطاقة النووية

3. بناء المزيد من محطات الطاقة الكهرومائية

4. أن نصبح أكثر كفاءة في استخدام الطاقة؟

Appendix E: Questionnaire Form in English Language

Dear Participant,

My name is Hana AL Balushi and I am a Post Graduate student at Northumbria University at Newcastle. The questionnaire is part of a research study on environmental attitudes and behaviours towards environmental issues within the sultanate of Oman. The research study is conducted as part of my university (Post Graduate Research) coursework and the findings will be useful in improving environmental planning in Oman. The study is examining the factors that determine students' environmental self-reported attitudes and behaviours towards environmental issues. Because you are an Omani student at Omani Government schools, aged between 15 to 18 years old and you have indicated that you are interested in taking part in this study, I am inviting you to participate in this research study by completing the attached survey. Feel free to fill in the Questionnaire willingly as the information provided will be treated with outmost confidentiality.

The following questionnaire will require approximately 20 minutes to complete. There is no compensation for responding nor is there any known risk. In order to ensure that all information will remain confidential, please *do not* include your name. If you choose to participate in this survey, please answer all questions as honestly as possible and submit the questionnaire to the researcher by hand. Participation is strictly voluntary and you may refuse to participate at any time.

Thank you for taking the time to assist me in my educational endeavors. If you would like a summary copy of this study, please complete and detach the Request for Information Form and submit it to me by hand in a separate envelope. Completion and return of the questionnaire will indicate your willingness to participate in this study. If you require additional information or have questions, please contact me through the email listed below.

Sincerely,

Hana AL Balushi

Researcher email: hanaalbalushi@moe.om

hana.m.s.a.balushi@northumbria.ac.uk

Request for Information

Please send a copy of the study results to the address listed below.

Name:

Address:

Please circle the most appropriate response.

1. Age

15	16	17	18
----	----	----	----

2. Gender

Male	Female
------	--------

3. School Name

--

4. Education level

Grade10	Grade11	Grade12
---------	---------	---------

5. Location of household

Rural setting	Urban setting
---------------	---------------

6. How often do you do the following pro-environmental behaviours in your day-to-day life?

Environmental Behaviours	Everyday	Once a week	Once a month	rarely	Never
N. Recycle things such as newspapers, cans, and glass					
O. Re-use bags or jars					
P. Turn off lights and electrical appliances when not in use or when you leave the room					
Q. Try not to drop litter					
R. Bike or walk to work					
S. Use the bus					

T. Carpool with others					
U. Run air conditioner less often in the summer					
V. Buy organic foods on a regular basis					
	Always	Very often	Occasionally	Rarely	Never
W. Purchase lamps, light-bulbs and appliances that are energy efficient					
X. Donate money annually to an environmental group or organization					
Y. Buy dolphin friendly tuna					
Z. Buy locally-grown foods on a regular basis					

7. How often do you participate in environmental activities?

(Please Tick where applicable)

Never	Rarely	Once a month	Once a week	Everyday

8. How Often you watch TV programs or read materials about the environment?

(Tick where applicable)

Never	Rarely	Once a month	Once a week	Everyday

B. Please give EXAMPLES of what you read or watch about the environment?

--

Indicate your agreement or disagreement for questions 9-14 with the following statements by circling your response using this scale:

1	2	3	4	5	6
Strongly Disagree	Disagree	Disagree Somewhat	Agree Somewhat	Agree	Strongly Agree

9. To what extent do you Agree that access to environmental education has an impact in changing your environmental attitudes and behaviours? (circle where appropriate)

1	2	3	4	5	6
---	---	---	---	---	---

10. Do you think environmental education should be provided in our schools?

1	2	3	4	5	6
---	---	---	---	---	---

11. Do you think Lack of environmental education programs in schools is a major cause for environmental unfriendly behaviours?

1	2	3	4	5	6
---	---	---	---	---	---

12. To what extent do you believe that your school is doing enough to empower students on environmental education?

1	2	3	4	5	6
---	---	---	---	---	---

13. To what extent do you agree or disagree with the following statements? (Tick where appropriate)

D. Our school mission supports environmental sustainability	1	2	3	4	5	6
E. Our school curriculum is supportive of environmental education	1	2	3	4	5	6
F. Environmental conservation is priority to our school	1	2	3	4	5	6

The following items describe statements about environmental behaviours in your individual lifestyle. **Indicate your agreement or disagreement for questions 14 A-E with the following statements by circling your response using this scale:**

1

2

3

4

5

**Strongly
Disagree**

Disagree

**Neither agree
Nor disagree**

Agree

**Strongly
Agree**

14.

Environmental Behaviour	1	2	3	4	5
F. When there is a choice, I always choose the product that contributes to the least amount of environmental damage.	1	2	3	4	5
G. I have switched products for environmental reasons.	1	2	3	4	5
H. If I understand the potential damage to the environment that some products can cause, I do not purchase those products.	1	2	3	4	5
I. Whenever possible, I buy products packaged in reusable or recyclable containers.	1	2	3	4	5
J. I have paid more for environmentally friendly products when there is a cheaper alternative.	1	2	3	4	5

15. Which of the following attitudes and behaviours best suit your opinion on environmental issues? (Tick where applicable)

E. Environmental pollution and degradation affects me	1	2	3	4	5
F. The government should introduce harsh measure to curb pollution	1	2	3	4	5
G. I am big champion of recycling and re-use of waste	1	2	3	4	5
H. I would be willing to engage in personal sacrifices to stop environmental pollution and degradation	1	2	3	4	5

16. What are major source of information on environmental education accessible to you?

Information source	Tick where appropriate	Information source	Tick where appropriate
Newspapers		Conversations with friends or neighbours	
Books		Government agencies (STATE OR FEDERAL)	
Journals		Conservation or Environmental Groups	
Social Media		Environmental learning centres, including nature centres, parks, science	
Workshops		Scientific experts	
School		Other	
Family			

17. If you would like to increase your environmental awareness, what method would you use? (Choose 3 only).

Method	Provide Examples
Education curricula at schools	
Radio	
Television	
Magazines	
Conferences and seminars	
Exhibitions	
Competitions	
Education campaigns	

18. I consider myself highly knowledgeable about Environmental issues (Tick the correct Box)

Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree

To answer the following questions (19-22), please use a 5-point scale where **1** means **very poor** and **5** means **very good**. Please circle the appropriate number from 1 to 5.

Very poor
→
 Very good

1 5

19. How much would you say you know about Environmental problems?

1	2	3	4	5
---	---	---	---	---

20. How much would you say you know about Air pollution?

1	2	3	4	5
---	---	---	---	---

21. How much would you say you know about Energy issues?

1	2	3	4	5
---	---	---	---	---

22. How much would you say you know about Water quality?

1	2	3	4	5
---	---	---	---	---

Please circle the correct answer for question 23-30. Circle one answer only

23. Global warming defined as “an increase in the Earth’s temperature caused by human activities.... Which release...greenhouse gases into the atmosphere.” Which of the following is a common greenhouse gas?

1. Sulfur dioxide
2. **Carbon dioxide**
3. Nitrogen or
4. Hydrogen

24. All the activities listed here are contributors of human-caused greenhouse gases in Oman. Which of the following is the LARGEST contributor to greenhouse gas emissions in Oman?

1. Agricultural operations
2. Leakage from refrigeration systems
3. **Burning fossil fuels (COAL, OIL, GASOLINE, DIESEL AND NATURAL GAS), or**
4. Gases released from landfills

25. What is the MOST common reason that an animal species becomes extinct in Oman? Is it because....

1. Pesticides are killing them
2. **Their habitats are being destroyed by humans**
3. There is too much hunting, or
4. There are climate changes that affect them

26. What is one of the MAIN benefits of wetlands? Do they...

1. Help to control global climate change
2. **Help filter and store water before it enters lakes, streams, rivers or oceans**
3. Prevent the spread of undesirable plants and animals, or

4. Provide good sites for landfills

27. Where does MOST of the garbage in Oman go? Would you say...

1. **Landfills**
2. Waste to energy incinerators
3. Burn barrels
4. Recycling centres
5. Compost facilities

28. Thinking about Oman, which of the following uses the most energy in people's homes? Is it...

1. Lighting rooms
2. Heating rooms
3. **Cooling rooms,**
4. Heating water, or
5. Refrigerating food

29. In the past ten years, has the fuel efficiency of vehicles in Oman

1. Increased
2. **Remained the same**
3. Decreased
4. Not been tracked

30. Which of the following do you think energy experts say is the fastest and most cost-effective way to address our overall energy needs? Would you say

1. Develop all possible domestic sources of oil and gas
2. Build more nuclear power plants
3. Build more hydroelectric power plants, or
4. **Become more energy efficient?**

Appendix F: Interviews' question Form in English Language

Study Title: Environmental education in Oman: Exploring the factors determine Students' self-reported environmental attitudes and behaviours toward Environmental issues

Hana AL BALUSHI
NORTHUMBRIA UNIVERSITY AT NEWCASTLE

Date 10/March/2018

Dear Participant,

My name is Hana AL Balushi and I am a Post Graduate student at Northumbria University at Newcastle. The Interview is part of a research study on environmental attitudes and behaviours of schools' students within the sultanate of Oman. The research study is conducted as part of my university (Post Graduate Research) coursework and the findings will be useful in improving environmental planning in Oman. The study is examining the factors that determine students' environmental self-reported attitudes and behaviours. Because you are an Omani student at Omani Government schools, aged between 15 to 18 years old and you have indicated that you are interested in taking part in this study, I am inviting you to participate in this research study by conducting an interview. Feel free to talk and answer interview's questions willingly as the information provided will be treated with outmost confidentiality.

The interview will require approximately 35 minutes. There is no compensation for responding nor is there any known risk. In order to ensure that all information will remain confidential, please *do not* include your name. If you choose to participate in this interview, please answer all questions as honestly as possible. Participation is strictly voluntary and you may refuse to participate at any time.

Thank you for taking the time to assist me in my educational endeavours. If you would like a summary copy of this study, please complete and detach the Request for Information Form and submit it to me by hand in a separate envelope. Completion of the interview will indicate your willingness to participate in this study. If you require additional information or have questions, please contact me through the email listed below.

Sincerely,

Hana AL Balushi

Researcher email: hanaalbalushi@moe.om

hana.m.s.a.balushi@northumbria.ac.uk

Request for Information

Please send a copy of the study results to the address listed below.

Name:

Address:

Semi- Structured Interview

Questions for students

1. What is your gender?
2. How Old are you?
3. What is your schools' name?
4. Where is your household location? Rural or Urban
5. What is Environmental Education?
6. Do you participate in Environmental Protection activities? Why? Give examples?
7. Do you recycle things such as newspapers, cans and glasses? Why? What are the benefits of recycling?
8. Why you Re-use bags or jar?
9. Why you Turn off lights and electrical appliances when not in use or when you leave the room?
10. Why you Try not to drop litter? What motivates you to not drop litter? What are the benefits of not dropping litter?
11. Do you walk to school? Why?
12. What do understand by the term carpool with others?
13. Why do you carpool with others? What are the benefits of carpooling with others?
14. Do you use the bus? Why? What are the benefits of using public bus?
15. Why do you run air conditioner more often in the summer?
16. Do you buy organic food? Why? If you have enough money will you buy?
17. Do you buy dolphin friendly tuna? Why?
18. What makes you donate money to environmental cases/organisations?

19. Do you read or watch material about the environment? Give examples
20. Do you Agree that access to environmental education has an impact in changing your environmental attitudes and behaviours? How?
21. Do you know about Environmental problems? Give examples
22. Where does house garbage go? How waste is managed?
23. The results of my research questionnaire showed that the level of Omani students' environmental knowledge is low. What are the main reasons of the low level of Omani environmental knowledge?
24. What is the major source of information on environmental education accessible to you?
25. Do you think lack of sources of information on environmental education is the main cause of your lack of knowledge on environmental problems?
26. What are the main causes of lack of knowledge on environmental issues?
27. What is your school's mission?
28. In your opinion, what factors related to schools that influence your environmental attitudes and behaviours?
29. What motivate your environmental attitudes and behaviours?

Questions for Teachers

1. What subject do you teach?
2. School name?
3. Teacher gender?
4. Years of experience?
5. Does your school curriculum is supportive of environmental education? How? Give examples

6. Is your school doing enough to empower students on environmental education? Give examples
7. Do you think Lack of environmental education programs in schools such as separate environmental education subject, extra-curricular activities, and training on environmental issues is a major cause for environmental unfriendly behaviours? Why?
8. Do you think environmental education should be provided in our schools? Why? What is the importance of environmental education?
9. To what extent do you agree that access to environmental education has an impact in changing students' environmental attitudes and behaviours? How?
10. In your opinion, what motivate students to donate money to environmental cases/organizations?
11. What is your school's mission?
12. The results of students' environmental knowledge assessment showed that the level of Omani students' environmental assessed knowledge is low why do you think Omani student's environmental knowledge is very poor?
13. Do you think we should have a separate an environmental education subject at our schools? Why?
14. In your opinion, what factors related to schools that influence student's environmental attitudes and behaviours?

Questions for Heads of the Schools

1. School name
2. Manager gender
3. Years of experiences
4. Qualification/Major

5. What is environmental education?
6. When Omani environmental day?
7. When is world environmental day?
8. What is your schools' mission?
9. Does your school mission support environmental sustainability? Give examples
10. Does Environmental conservation is priority to your school?
11. Do you think Lack of environmental education programs in schools such as separate environmental education subject, extra-curricular activities, and training on environmental issues is a major cause for environmental unfriendly behaviours?
12. Is your school doing enough to empower students on environmental education? Give examples of environmental activities that run in your schools?
13. In your opinion, what factors related to schools that influence student's environmental attitudes and behaviours?
14. Do your school participate in environmental conservation activities inside and out of schools?

Appendix G: Interviews' question Form in Arabic Language

استقصاء المواقف والمعارف والسلوكيات البيئية للطلبة العُمانيين

عنوان الدراسة: التعليم البيئي في سلطنة عُمان: دراسة العوامل التي تحدد
المواقف والسلوكيات البيئية التي يعبر عنها الطلبة بخصوص قضايا البيئة

التاريخ: 04/04/2018

عزيزي المشارك،

اسمي هو هناء البلوشي وأنا طالبة دكتوراة في جامعة نورثومبريا في نيوكاسل في المملكة المتحدة. وهذه المقابلة هي جزء من دراسة بحثية حول المواقف والسلوكيات البيئية لطلبة المدارس تجاه قضايا البيئة داخل سلطنة عُمان. تُنفذ هذه الدراسة البحثية كجزء من مقرراتي الجامعية (بحث الدكتوراة) وستكون نتائج هذا البحث مفيدة في تحسين التخطيط البيئي في سلطنة عُمان. تبحث هذه الدراسة في العوامل التي تحدد المواقف والسلوكيات البيئية التي يعبر عنها الطلبة تجاه قضايا البيئة. وبما أنك طالب/ طالبة / معلم / معلمة/ مدير/مديرة مدرسة عُمان تدرس أو موظف في مدرسة حكومية عُمانية بالإضافة إلى إظهارك الاهتمام بالمشاركة في هذه الدراسة، فإنني أدعوك للمشاركة في هذه الدراسة البحثية من خلال إكمال المقابلة. لا تتردد في الإجابة على أسئلة المقابلة لأنه سيتم التعامل مع المعلومات المقدمة بسرية تامة.

تستغرق المقابلة الآتية حوالي 30 دقيقة لإكماله. ولا يوجد أي مقابل مادي للإجابة على أسئلة الاستبيان كما لا توجد أي مخاطرة في ذلك. ولضمان بقاء جميع المعلومات سرية، يرجى عدم إدراجك اسمك أثناء المقابلة. وإذا قررت المشاركة في هذه المقابلة، يرجى الإجابة على جميع الأسئلة بأقصى أمانة ممكنة. تعتبر المشاركة في هذه المقابلة طوعية تمامًا ويجوز لك رفض المشاركة في أي وقت.

أشكرك على الوقت الذي قدمته لمساعدتي في جهودي التعليمية. وإذا أردت الحصول على نسخة موجزة من هذه الدراسة، يرجى إكمال وفصل استمارة طلب المعلومات وتقديمها لي باليد في مظروف منفصل. إن إكمال المقابلة توضح رغبتك في المشاركة في هذه الدراسة. وفي حالة حاجتك إلى معلومات إضافية أو كانت لديك أسئلة، يرجى التواصل معي عن طريق البريد الإلكتروني الوارد أدناه.

خالص التحية،

هناء البلوشي

hanaalbalushi@moe.om البريد الإلكتروني للباحثة:

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طلب المعلومات:

يرجى إرسال صورة من نتائج الدراسة على العنوان الوارد أدناه

الاسم:

العنوان:

أسئلة المقابلات

أسئلة للطلاب:

1- ما هو جنسك؟

2- السن؟

3- اسم المدرسة ؟

4- مكان المسكن الريف أو المدينة؟

5- ماذا تعرف عن التعليم البيئي؟

6- هل تشارك في أنشطة حماية البيئة؟ لماذا؟ أعطي أمثلة؟

7- هل تقوم بإعادة تدوير الأشياء مثل الصحف، والعلب، والزجاج؟ لماذا؟ ماهي فوائد إعادة التدوير؟

8- إعادة استخدام الأكياس أو البرطمانات؟ لماذا؟

9- لماذا تطفئ الأنوار والأجهزة الكهربائية في حالة عدم استخدامها أو عندما تغادر الغرفة؟

10- لماذا ترمي القمامة في الأماكن المخصصة لها؟ ماهي الدوافع التي تعزز رميك القمامة في الأماكن المخصصة

لها؟ ماهي فوائد رمي القمامة في الأماكن المخصصة لها؟

11- هل تمشي من البيت إلى المدرسة ؟ لماذا؟

12- ماذا تفهم من عبارة مشاركة السيارة مع الآخرين ؟

13- لماذا تشارك السيارة مع الآخرين؟ ماهي فوائد مشاركة السيارة مع الآخرين؟

14- هل تستخدم المواصلات العامة للتنقل؟ لماذا؟ ماهي فوائد استخدام المواصلات العامة للتنقل؟

15- لماذا تشغل مكيف الهواء بصورة أقل في الصيف ؟

16- هل تشتري الأطعمة العضوية "الأورجنيك" بانتظام ؟ لماذا ؟ إذا كان لديك المال الكافي هل تشتري؟

17- هل تشتري التونة الصديقة للدلافين؟ لماذا؟

18- ماهي الدوافع التي تعزز لديك التبرع بالأموال لمجموعة أو منظمة بيئية؟

- 19- هل تشاهد البرامج التليفزيونية أو تقرأ مواد حول البيئة؟ أعط أمثلة؟
- 20- هل توافق أن التعليم البيئي له تأثير في تغيير مواقفك وسلوكياتك البيئية؟ كيف؟
- 21- هل تعرف عن المشاكل البيئية في العالم؟ أعط أمثلة؟
- 22- أين يتم التخلص من النفايات؟ كيف تتم إدارة النفايات؟ في سلطنة عمان
- 23- ظهرت نتائج استبيان البحث بأن مستوى طلاب في المعرفة البيئية ضعيف . برأيك ماهي الاسباب الرئيسية لضعف معرفة الطلاب عن المشاكل البيئية؟
- 24- ما هي المصادر الرئيسية للمعلومات حول التعليم البيئي التي يمكنك الوصول إليها؟
- 25- برأيك قلة المصادر الرئيسية للمعلومات حول التعليم البيئي هو السبب الرئيسي لضعف المعرفة عن المشاكل البيئية؟
- 26- ماهي الاسباب الرئيسية لضعف المعرفة حول القضايا البيئية؟
- 27- ماهي رسالة مدرستك؟
- 28- برأيك ماهي العوامل المدرسية التي تؤثر على مواقفك وسلوكياتك البيئية؟
- 29- ماهي الدوافع التي تعزز مواقفك وسلوكياتك البيئية؟

أسئلة للمعلمين:

- 1- أي مادة مدرسية تدرس؟
- 2- اسم المدرسة؟
- 3- ماهو جنسك؟
- 4- عدد سنوات الخبرة؟
- 5- يدعم منهج مدرستنا التعليم البيئي؟ كيف؟ أعط أمثلة؟
- 6- هل مدرستك تبذل جهود كافية لتمكين الطلاب في التعليم البيئي؟ أعطي أمثلة؟
- 7- هل ترى أن نقص برامج التعليم البيئي في المدارس مثل مادة التعليم البيئي و أنشطة عملية إضافية للمنهج حول المشاكل البيئية هو السبب الرئيسي للسلوكيات غير الصديقة للبيئة؟
- 8- هل ترى أنه ينبغي تقديم التعليم البيئي في مدارسنا؟ لماذا؟ ما أهمية التعليم البيئي؟
- 9- هل توافق على أن الوصول إلى التعليم البيئي له تأثير في تغيير مواقفك وسلوكياتك البيئية؟ كيف؟

10- برأيك ماهي العوامل المدرسية التي تؤثر على مواقف وسلوكيات البيئة للطلاب ؟

11- برأيك ماهي الدوافع التي تعزز الطلاب التبرع بالأموال لمجموعة أو منظمة بيئية؟

12- ماهي رسالة مدرستك ؟

13- ظهرت نتائج استبيان البحث بأن مستوى طلاب في المعرفة البيئية ضعيف . برأيك ماهي الاسباب الرئيسية

لضعف معرفة الطلاب عن المشاكل البيئية؟

14- برأيك هل يجب تقديم مادة التعليم البيئي كمادة منفصلة في مدارس سلطنة عمان ؟

أسئلة لمدرء المدارس:

1- اسم المدرسة؟

2- الجنس؟

3- عدد سنوات الخبرة؟

4- ما هو مؤهلك الدراسي ؟

5- ماذا تعرف عن التعليم البيئي؟

6- متى يصادف اليوم البيئي العماني؟

7- متى يصادف اليوم العالمي للبيئة ؟

8- ماهي رسالة مدرستك؟

9- هل تدعم رسالة مدرستك الاستدامة البيئية؟ أعط أمثلة؟

10- هل ترى أن نقص برامج التعليم البيئي في المدارس مثل مادة التعليم البيئي و أنشطة عملية إضافية للمنهج

حول المشاكل البيئية هو السبب الرئيسي للسلوكيات غير الصديقة للبيئة؟

11- هل مدرستك تبذل جهود كافية لتمكين الطلاب في التعليم البيئي؟ أعطي أمثلة؟

12- برأيك ماهي العوامل المدرسية التي تؤثر على مواقف وسلوكيات البيئة للطلاب؟

13- هل تشارك مدرستك في أنشطة حماية البيئة داخل وخارج المدرسة؟

Appendix H: Interviews' transcripts:

Researcher (R) /Participant (P) (1):

Interview with the principal of the school A

R: What is environmental education?

P: For me, I have not been exposed to the environmental education but from my own point of view. It is the education that is taken from the environment itself and use the environmental factors in learning and teaching.

What is the environmental education or the environmental bringing-up? Environmental education is the education that depends on environment and use of the same in the education.

Hana: both names are the same but one of them is used in some countries and the other is used in other countries.

We mean here that all things, subject, scientific subject that deals with environment and its problems whether for the whole world or for the same country. It is also related to the environmental health and hygiene. Do you have any information about this matter?

Yes, environment is a part of the school curricula as seen in some examples in the school subject like life skills, geography, Arabic texts and Islamic education, and even in English language texts. There are some texts talking about this matter in addition to other school subjects. It also tackles the matter of spreading awareness amongst the Omani people and how to preserve and develop the environment and their country achievement. This also has something to do with the sustainable development.

R: When Omani environmental day?

R: When is world environmental day?

R: What is your schools' mission?

The school seeks to raise the level of awareness and bringing up the good citizen who is able to build up the future.

R: Does your school mission support environmental sustainability? Give examples

P: Yes, for example, one week ago there was a training programme week "together for clean life" this week covered several issues with regard to the environment and preservation of it.

The most significant value of this week was the honesty which helps us to preserve our environment, public property and private property and how to bring out good citizens. There is also "The Tree Day" which also casted light upon the environment preservation and the green cover.

R: Do you think Lack of environmental education programs in schools such as separate environmental education subject, extra-curricular activities, and training on environmental issues is a major cause for environmental unfriendly behaviours?

This could be a part of the problem, but there are several factors with regard to the family, relations and many other factors because the school and the curricula are not the only influential factors in this matter.

R: Is your school doing enough to empower students on environmental education? Give examples of environmental activities that run in your schools?

The school follows its educational plan that contains many activities and events. It also works on utilizing such events during the classrooms and the morning school ceremony. The social specialist also plays a role in this regard together with the in-house nurse who gives some instructions and lectures related to this matter, not to mention some

lectures given by specialists from outside the school. We also made an art fair about environment in addition to Globe Program that raise awareness amongst the students.

R: In your opinion, what factors related to schools that influence student's environmental attitudes and behaviours?

The school climate including the school vision towards the environmental issues particularly the school principal's trends and motives. The school management and its policies, plans, the curricula and the students themselves. All these factors play a role in raising the level of environment awareness.

The methods of training that also cast light upon such issues and the professional trainings.

R: Do your school participate in environmental conservation activities inside and out of schools?

Yes, our school participates in such activities by taking part in some competitions. This also includes some art competitions and singing competition. We are working in cooperation with some external organizations.

We have taken part in cleaning some beaches. We found good interaction amongst the students to participate in such activities. We shall cast more light upon this issue in our future plans.

We have a problem and challenge with regard to participating in Sultan Qaboos Award as the students in this academic level gives more importance to the school subjects and academic activities. We are trying to motivate the students to participate in these activities, but this sometimes contradicts with the academic activities of the school.

I support adding the environmental activities to some school subjects and make such activities part of the academic final score.

I also recommend adding a subject in the faculty of education which casts light on the role of the teacher in the environmental education.

The teachers should be given awareness during the college period and make them totally aware about this matter so that they can transfer this knowledge to the students.

R: Do you agree to use all the information given in this interview for the use of research in Northumbria University in Newcastle, UK?

P: Yes, I agree.

R: In your opinion, what motivate students to donate money to environmental cases/organizations?

P: The curricula, teacher and the school competitions. The awareness is the most important factor as it motivates the students to work more for the protection of their environment.

R: What is your school's mission?

P: I don't know about it. I have not accessed it before.

R: The results of students' environmental knowledge assessment showed that the level of Omani students' environmental assessed knowledge is low why do you think Omani student's environmental knowledge is very poor?

P: This could be attributed to the curricula lack of concern about this matter. The media also should give more focus on this matter.

R: Do you think we should have a separate an environmental education subject at our schools? Why?

P: This is not a condition. This matter is related to several academic subjects such as science and other subjects. It is good if we makes it as an educative subject not as a major subject for the final examinations.

R: In your opinion, what factors related to schools that influence student's environmental attitudes and behaviours?

For example, some students during the free time or the break collect the garbage and throw them in their specified places. The teacher plays a role in this matter. Many teachers pay much attention to the cleanness of the classroom before starting the academic activities. The school management also pays attention to this matter in addition to the projects that they carry out to the protection of environment.

Interview with student 5

Questions for students

1. What is Environmental Education?

There are issues about the environment culture. It deals about the environment issues, problems and the solutions to such problems and how we can contribute in the environment protection.

2. Do you participate in Environmental Protection activities? Why? Give examples?

Yes, because we live inside this environment. If this environment is good that means our life will be good. If the environment is bad our life will be bad.

Some examples such as cleanness of beaches.

3. Do you recycle things such as newspapers, cans and glasses? Why? What is the benefits of recycling?

No, I don't have enough time. There are specialized organizations who carries out this job. This is good for mitigating the damage to the environment, because such materials are harmful to the environment that can also harm the animals.

4. Why you Re-use bags or jar?

Yes, we re-use them because they are harmful to the environment while we can benefit from them.

5. Why you Turn off lights and electrical appliances when not in use or when you leave the room?

This saves the power. This is non-renewal energy so that we have to save it. This also gives bad emission that harm the human and the environment.

6. Why you Try not to drop litter? What motivates you to not drop litter? What are the benefits of not dropping litter?

Our God incites us to keep clean and I don't like to stay in a place that is not clean. The motives come first from our religion. We also like to keep our nation clean in front of the world. This is also good for the environment in order to mitigate the harm to our nation. We throw the garbage in the specified places to enable the companies to collect them and throw them in the landfills.

7. Do you walk to school? Why?

Yes, it good as practice. This also saves money and saves energy. It also saves the environment from the harmful emission. When the weather is good, I like to enjoy walking to school

8. What do understand by the term carpool with others?

This is good to create friendly life with our colleagues.

9. Why do you carpool with others? What are the benefits of carpooling with others?

This helps to save energy and saves our national wealth that depends on petrol.

10. Do you use the bus? Why? What are the benefits of using public bus?

Here in Oman no, but outside Oman we usually use it. We use them outside because there we don't have our private cars. This is good for our country budget to use the public transport. It also saves us from the air pollution by using fewer number of cars. The nature will be healthier

11. Why do you run air conditioner less often in the summer?

I use it more in the summer because it is hot.

12. Do you buy organic food? Why? If you have enough money will you buy?

No, I like the fast food. If I have enough money to purchase the organic foods, of course I will purchase them because it is healthier. Organic food is good because it is not using pesticides and chemicals that harm the environment. We should use the organic foods to protect our environment.

13. Do you buy dolphin friendly tuna? Why?

Yes, this is the only available type in Oman. I like to eat it because I am not allergic to it.

14. What makes you donate money to environmental cases/organisations?

Environment protection, religious awareness and our God incites us to keep cleanness. I like to live in a clean environment.

15. Do you read or watch material about the environment? Give examples

Yes, I watch National Geographic TV channel that broadcasts many issues about the environment issues, problems and solutions. I also follow some other TV channels that talk about this matter.

16. Do you Agree that access to environmental education has an impact in changing your environmental attitudes and behaviours? How?

Yes of course if there is awareness about the environment issues, the person will protect the environment and will not harm it. It helps not to harm or damage our nature.

17. Do you know about Environmental problems? Give examples

Yes, some examples are forest fires and Ozone problems and the red tide. I think the cause of this was the pollution.

18. Where does house garbage go? How waste is managed?

For my knowledge, they use the landfills that are located far from the dwellings. They destroy them by burning or recycling them.

19. The results of my research questionnaire showed that the level of Omani students' environmental knowledge is low. What are the main reasons of the low level of Omani environmental knowledge?

Because of the lack of the subjects that talk about the environment education.

20. What are the major source of information on environmental education accessible to you?

The internet, libraries and the people who are specialized in this matter.

21. Do you think lack of sources of information on environmental education is the main cause of your lack of knowledge on environmental problems?

No. I think the main cause is those people who are not aware about such issue. It comes from the person himself.

22. What are the main causes of lack of knowledge on environmental issues?

I think this depends on the individual who doesn't like to get knowledge about such issue or doesn't have trends to be aware about them. There could be lack of sources.

The school has few number of subjects that talk about environmental education.

23. What is your school's mission?

Protection of environment and encourage creativity, and the attempt to change the world.

24. In your opinion, what factors related to schools that influence your environmental attitudes and behaviours?

The bad colleagues and the lack of motives. This should come from the teachers who should encourage us to contribute in this matter. They give more focus on the academic issues.

25. What motivate your environmental attitudes and behaviours?

Our instinct that encourage us to save the environment. If I find that the people around me have awareness about the environment issues this will encourage me to get more knowledge and be friendlier to the environment. The family also plays a role in this matter.

Appendix I: Descriptive Statistics

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
How often do you Recycle things such as newspapers, cans, and glass	210	1.00	5.00	2.5905	.99948
How often do you do Re-use bags or jars	211	1.00	5.00	3.5118	1.32866
How often do you do Turn off lights and electrical appliances when not in use or when you leave the room	212	1.00	5.00	4.6415	.88899
How often do you do Try not to drop litter	211	1.00	5.00	4.6445	.90591
How often do you do Bike or walk to School	210	1.00	5.00	3.1524	1.42956
How often do you do Use the bus	209	1.00	5.00	3.3062	1.61484
How often do you do Carpool with Others	207	1.00	5.00	3.6135	1.43649
How often do you do Purchase lamps, light-bulbs and appliances that are energy efficient	210	1.00	5.00	2.8524	1.23433
How often do you do Run air conditioner less often in the summer	212	1.00	5.00	2.9340	1.35792
How often do you do Donate money annually to an environmental group or organization	211	1.00	5.00	2.9621	1.11205
How often do you do Buy organic foods on a regular basis	203	1.00	5.00	3.0197	1.27800
How often do you do Buy dolphin friendly tuna	206	1.00	5.00	2.4417	1.21535

How often do you do Buy locally-grown foods on a regular basis	207	1.00	5.00	3.5411	1.22949
How often do you participate in environmental protection activities e.g. Littering, planting, recycling?	211	1.00	5.00	2.0521	1.26571
How often do you watch TV programs or read material about the environment?	209	1.00	5.00	3.0000	1.52227
To what extent do you Agree that access to environmental education has an impact in changing your environmental attitudes and behaviours?	211	1.00	6.00	4.8057	1.33637
Do you think environmental education should be provided in our schools?	212	1.00	6.00	4.7925	1.43231
Do you think Lack of environmental education programs in schools is a major cause for environmental unfriendly behaviours?	212	1.00	6.00	4.5000	1.54398
your school is doing enough to empower students on environmental education?	212	1.00	6.00	4.0613	1.50544
Our school mission supports environmental sustainability	210	1.00	6.00	4.5810	1.28503
Our school curriculum is supportive of environmental education	211	1.00	6.00	4.1659	1.41958
Environmental conservation is priority to our school	211	1.00	6.00	4.6303	1.38901
When there is a choice, I always choose the	209	1.00	5.00	4.0191	1.07847

product that contributes to the least amount of environmental damage.					
I have switched products for environmental reasons.	211	1.00	5.00	3.5213	1.09252
If I understand the potential damage to the environment that some products can cause, I do not purchase those products.	210	1.00	5.00	3.8524	1.15420
Whenever possible, I buy products packaged in reusable or recyclable containers.	209	1.00	5.00	3.6794	1.09527
I have paid more for environmentally friendly products when there is a cheaper alternative.	211	1.00	5.00	3.3270	1.11790
Environmental pollution and degradation affects me	206	1.00	5.00	4.2864	1.03146
The government should introduce harsh measure to curb pollution	208	1.00	5.00	4.2356	1.11090
I am big champion of recycling and re-use of waste	206	1.00	5.00	4.0049	1.12834
I consider myself highly knowledgeable about Environmental issues	204	1.00	5.00	3.6373	.93944
How much would you say you know about Environmental problems?	207	1.00	5.00	3.4058	1.01903
How much would you say you know about Air pollution?	207	1.00	5.00	3.5217	1.06044
How much would you say you know about Energy issues?	208	1.00	5.00	3.1346	1.07279

How much would you say you know about Water quality?	203	1.00	5.00	3.5567	1.15634
I would be willing to engage in personal sacrifices to stop environmental pollution and degradation	198	1.00	5.00	3.8586	1.12209
Valid N (listwise)	153				

Appendix J: Abbreviations

This is the list of abbreviations through the thesis.

Education for sustainable development (ESD)

Environment Society of Oman (ESO)

Environmental Education (EE)

global citizenship education development (GCED)

GCC (Gulf Cooperation Council)

Kaiser Meyer Olkin (KMO)

Millennium development goals (MDGs)

Ministry of Education (MOE)

Ministry of Environment and Climate Affairs (MECA)

National Centre for Statistics and Information (NCSI)

principal components analysis (PCA)

Pro-environmental behaviour (PEB)

Responsible Environmental Behaviour (REB)

Sustainable Development Goals (SDGs)

(SREAB) self-reported environmental attitudes and behaviours [this was not used]

United Nations (UN)

Workplace sustainability programmes (WSPs)

Appendix K: Frequencies

		Age			Cumulative Percent
		Frequency	Percent	Valid Percent	
Valid	15	81	38.2	38.2	38.2
	16	82	38.7	38.7	76.9
	17	43	20.3	20.3	97.2
	18	6	2.8	2.8	100.0
	Total	212	100.0	100.0	

		Gender			Cumulative Percent
		Frequency	Percent	Valid Percent	
Valid	male	66	31.1	31.1	31.1
	female	146	68.9	68.9	100.0
	Total	212	100.0	100.0	

		School Name			Cumulative Percent
		Frequency	Percent	Valid Percent	
Valid	South Mabellah	41	19.3	19.3	19.3
	Sheikh Hamdan bin KHAMIS	25	11.8	11.8	31.1
	Hassan bin Hashim	41	19.3	19.3	50.5
	Hail al-Awamer	105	49.5	49.5	100.0
	Total	212	100.0	100.0	

		Education level			Cumulative Percent
		Frequency	Percent	Valid Percent	
Valid	grade 10	81	38.2	38.2	38.2
	grade 11	108	50.9	50.9	89.2
	grade 12	23	10.8	10.8	100.0
	Total	212	100.0	100.0	

Location of household

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Urban	212	100.0	100.0	100.0

How often do you Recycle things such as newspapers, cans, and glass

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	8	3.8	3.8	3.8
	Rarely	126	59.4	60.0	63.8
	Once a month	35	16.5	16.7	80.5
	Once a week	26	12.3	12.4	92.9
	Everyday	15	7.1	7.1	100.0
	Total	210	99.1	100.0	
Missing	111.00	2	.9		
Total		212	100.0		

How often do you do Re-use bags or jars

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	6	2.8	2.8	2.8
	Rarely	66	31.1	31.3	34.1
	Once a month	28	13.2	13.3	47.4
	Once a week	36	17.0	17.1	64.5
	Everyday	75	35.4	35.5	100.0
	Total	211	99.5	100.0	
Missing	111.00	1	.5		
Total		212	100.0		

How often do you do Turn off lights and electrical appliances when not in use or when you leave the room

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	2	.9	.9	.9
	Rarely	13	6.1	6.1	7.1
	Once a month	8	3.8	3.8	10.8
	Once a week	13	6.1	6.1	17.0
	Everyday	176	83.0	83.0	100.0
	Total	212	100.0	100.0	

How often do you do Try not to drop litter

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	4	1.9	1.9	1.9
	Rarely	11	5.2	5.2	7.1
	Once a month	5	2.4	2.4	9.5
	Once a week	16	7.5	7.6	17.1
	Everyday	175	82.5	82.9	100.0
	Total	211	99.5	100.0	
Missing	111.00	1	.5		
Total		212	100.0		

How often do you do Bike or walk to School

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	23	10.8	11.0	11.0
	Rarely	76	35.8	36.2	47.1
	Once a month	12	5.7	5.7	52.9
	Once a week	44	20.8	21.0	73.8
	Everyday	55	25.9	26.2	100.0
	Total	210	99.1	100.0	
Missing	111.00	2	.9		
Total		212	100.0		

How often do you do Use the bus

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	28	13.2	13.4	13.4
	Rarely	73	34.4	34.9	48.3
	Once a month	7	3.3	3.3	51.7
	Once a week	9	4.2	4.3	56.0
	Everyday	92	43.4	44.0	100.0
	Total	209	98.6	100.0	
Missing	111.00	3	1.4		
Total		212	100.0		

How often do you do Carpool with Others

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	15	7.1	7.2	7.2
	Rarely	56	26.4	27.1	34.3
	Once a month	10	4.7	4.8	39.1
	Once a week	39	18.4	18.8	58.0
	Everyday	87	41.0	42.0	100.0
	Total	207	97.6	100.0	
Missing	111.00	5	2.4		
Total		212	100.0		

How often do you do Purchase lamps, light-bulbs and appliances that are energy efficient

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	22	10.4	10.5	10.5
	Rarely	77	36.3	36.7	47.1
	Occasionally	55	25.9	26.2	73.3
	Very often	22	10.4	10.5	83.8
	Always	34	16.0	16.2	100.0
	Total	210	99.1	100.0	
Missing	111.00	2	.9		
Total		212	100.0		

How often do you do Run air conditioner less often in the summer

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	19	9.0	9.0	9.0
	Rarely	97	45.8	45.8	54.7
	Once a month	23	10.8	10.8	65.6
	Once a week	25	11.8	11.8	77.4
	Everyday	48	22.6	22.6	100.0
	Total	212	100.0	100.0	

How often do you do Donate money annually to an environmental group or organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	17	8.0	8.1	8.1
	Rarely	59	27.8	28.0	36.0
	Occasionally	74	34.9	35.1	71.1
	Very often	37	17.5	17.5	88.6
	Always	24	11.3	11.4	100.0
	Total	211	99.5	100.0	
Missing	111.00	1	.5		
Total		212	100.0		

How often do you do Buy organic foods on a regular basis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	17	8.0	8.4	8.4
	Rarely	76	35.8	37.4	45.8
	Once a month	32	15.1	15.8	61.6
	Once a week	42	19.8	20.7	82.3
	Everyday	36	17.0	17.7	100.0
	Total	203	95.8	100.0	
Missing	111.00	9	4.2		
Total		212	100.0		

How often do you do Buy dolphin friendly tuna

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	43	20.3	20.9	20.9
	Rarely	91	42.9	44.2	65.0
	Occasionally	31	14.6	15.0	80.1
	Very often	20	9.4	9.7	89.8
	Always	21	9.9	10.2	100.0
	Total	206	97.2	100.0	
Missing	111.00	6	2.8		
Total		212	100.0		

How often do you do Buy locally-grown foods on a regular basis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	12	5.7	5.8	5.8
	Rarely	36	17.0	17.4	23.2
	Occasionally	45	21.2	21.7	44.9
	Very often	56	26.4	27.1	72.0
	Always	58	27.4	28.0	100.0
	Total	207	97.6	100.0	
Missing	111.00	5	2.4		
Total		212	100.0		

How often do you participate in environmental protection activities e.g. Littering, planting, recycling?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	103	48.6	48.8	48.8
	Rarely	39	18.4	18.5	67.3
	Once a month	39	18.4	18.5	85.8
	Once a week	15	7.1	7.1	92.9
	Everyday	15	7.1	7.1	100.0
	Total	211	99.5	100.0	
Missing	111.00	1	.5		
Total		212	100.0		

How often do you watch TV programs or read material about the environment?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	59	27.8	28.2	28.2
	Rarely	21	9.9	10.0	38.3
	Once a month	33	15.6	15.8	54.1
	Once a week	53	25.0	25.4	79.4
	Everyday	43	20.3	20.6	100.0
	Total	209	98.6	100.0	
Missing	111.00	3	1.4		
Total		212	100.0		

To what extent do you Agree that access to environmental education has an impact in changing your environmental attitudes and behaviours?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	11	5.2	5.2	5.2
	Disagree	6	2.8	2.8	8.1
	Disagree Somewhat	7	3.3	3.3	11.4
	Agree Somewhat	45	21.2	21.3	32.7
	Agree	62	29.2	29.4	62.1
	Strongly Agree	80	37.7	37.9	100.0
	Total	211	99.5	100.0	
Missing	111.00	1	.5		
Total		212	100.0		

Do you think environmental education should be provided in our schools?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	12	5.7	5.7	5.7
	Disagree	8	3.8	3.8	9.4
	Disagree Somewhat	16	7.5	7.5	17.0
	Agree Somewhat	27	12.7	12.7	29.7
	Agree	62	29.2	29.2	59.0
	Strongly Agree	87	41.0	41.0	100.0
	Total	212	100.0	100.0	

Do you think Lack of environmental education programs in schools is a major cause for environmental unfriendly behaviours?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	14	6.6	6.6	6.6
	Disagree	14	6.6	6.6	13.2
	Disagree Somewhat	19	9.0	9.0	22.2
	Agree Somewhat	50	23.6	23.6	45.8
	Agree	35	16.5	16.5	62.3
	Strongly Agree	80	37.7	37.7	100.0
	Total	212	100.0	100.0	

your school is doing enough to empower students on environmental education?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	19	9.0	9.0	9.0
	Disagree	19	9.0	9.0	17.9
	Disagree Somewhat	24	11.3	11.3	29.2
	Agree Somewhat	56	26.4	26.4	55.7
	Agree	56	26.4	26.4	82.1
	Strongly Agree	38	17.9	17.9	100.0
	Total	212	100.0	100.0	

Our school mission supports environmental sustainability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	6	2.8	2.9	2.9
	Disagree	12	5.7	5.7	8.6
	Disagree Somewhat	17	8.0	8.1	16.7
	Agree Somewhat	52	24.5	24.8	41.4
	Agree	65	30.7	31.0	72.4
	Strongly Agree	58	27.4	27.6	100.0
	Total	210	99.1	100.0	
Missing	111.00	2	.9		
Total		212	100.0		

Our school curriculum is supportive of environmental education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	16	7.5	7.6	7.6
	Disagree	7	3.3	3.3	10.9
	Disagree Somewhat	38	17.9	18.0	28.9
	Agree Somewhat	57	26.9	27.0	55.9
	Agree	51	24.1	24.2	80.1
	Strongly Agree	42	19.8	19.9	100.0
	Total	211	99.5	100.0	
Missing	111.00	1	.5		
Total		212	100.0		

Environmental conservation is priority to our school

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	8	3.8	3.8	3.8
	Disagree	13	6.1	6.2	10.0
	Disagree Somewhat	19	9.0	9.0	19.0
	Agree Somewhat	41	19.3	19.4	38.4
	Agree	58	27.4	27.5	65.9
	Strongly Agree	72	34.0	34.1	100.0
	Total	211	99.5	100.0	
Missing	111.00	1	.5		
Total		212	100.0		

When there is a choice, I always choose the product that contributes to the least amount of environmental damage.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	8	3.8	3.8	3.8
	Disagree	7	3.3	3.3	7.2
	Neither Agree or Disagree	50	23.6	23.9	31.1
	Agree	52	24.5	24.9	56.0
	Strongly Agree	92	43.4	44.0	100.0
	Total	209	98.6	100.0	

Missing	111.00	3	1.4		
Total		212	100.0		

I have switched products for environmental reasons.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	14	6.6	6.6	6.6
	Disagree	9	4.2	4.3	10.9
	Neither Agree or Disagree	89	42.0	42.2	53.1
	Agree	51	24.1	24.2	77.3
	Strongly Agree	48	22.6	22.7	100.0
	Total	211	99.5	100.0	
Missing	111.00	1	.5		
Total		212	100.0		

If I understand the potential damage to the environment that some products can cause, I do not purchase those products.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	13	6.1	6.2	6.2
	Disagree	8	3.8	3.8	10.0
	Neither Agree or Disagree	55	25.9	26.2	36.2
	Agree	55	25.9	26.2	62.4
	Strongly Agree	79	37.3	37.6	100.0
	Total	210	99.1	100.0	
Missing	111.00	2	.9		
Total		212	100.0		

Whenever possible, I buy products packaged in reusable or recyclable containers.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	10	4.7	4.8	4.8
	Disagree	12	5.7	5.7	10.5
	Neither Agree or Disagree	73	34.4	34.9	45.5
	Agree	54	25.5	25.8	71.3
	Strongly Agree	60	28.3	28.7	100.0
	Total	209	98.6	100.0	
Missing	111.00	3	1.4		
Total		212	100.0		

I have paid more for environmentally friendly products when there is a cheaper alternative.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	18	8.5	8.5	8.5
	Disagree	18	8.5	8.5	17.1
	Neither Agree or Disagree	88	41.5	41.7	58.8
	Agree	51	24.1	24.2	82.9
	Strongly Agree	36	17.0	17.1	100.0
	Total	211	99.5	100.0	
Missing	111.00	1	.5		
Total		212	100.0		

Environmental pollution and degradation affects me

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	5	2.4	2.4	2.4
	Disagree	7	3.3	3.4	5.8
	Neither Agree or Disagree	37	17.5	18.0	23.8
	Agree	32	15.1	15.5	39.3
	Strongly Agree	125	59.0	60.7	100.0
	Total	206	97.2	100.0	
Missing	111.00	6	2.8		
Total		212	100.0		

The government should introduce harsh measure to curb pollution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	9	4.2	4.3	4.3
	Disagree	5	2.4	2.4	6.7
	Neither Agree or Disagree	40	18.9	19.2	26.0
	Agree	28	13.2	13.5	39.4
	Strongly Agree	126	59.4	60.6	100.0
	Total	208	98.1	100.0	
Missing	111.00	4	1.9		
Total		212	100.0		

I am big champion of recycling and re-use of waste

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	9	4.2	4.4	4.4
	Disagree	9	4.2	4.4	8.7
	Neither Agree or Disagree	49	23.1	23.8	32.5
	Agree	44	20.8	21.4	53.9
	Strongly Agree	95	44.8	46.1	100.0
	Total	206	97.2	100.0	
Missing	111.00	6	2.8		
Total		212	100.0		

I would be willing to engage in personal sacrifices to stop environmental pollution and degradation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	10	4.7	5.1	5.1
	Disagree	10	4.7	5.1	10.1
	Neither Agree or Disagree	50	23.6	25.3	35.4
	Agree	56	26.4	28.3	63.6
	Strongly Agree	72	34.0	36.4	100.0
	Total	198	93.4	100.0	
Missing	111.00	14	6.6		
Total		212	100.0		

I consider myself highly knowledgeable about Environmental issues

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strogly Disagree	6	2.8	2.9	2.9
	Disagree	10	4.7	4.9	7.8
	Neither Agree or Disagree	74	34.9	36.3	44.1
	Agree	76	35.8	37.3	81.4
	Strongly Agree	38	17.9	18.6	100.0
	Total	204	96.2	100.0	
Missing	111.00	8	3.8		
Total		212	100.0		

How much would you say you know about Water quality?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	14	6.6	6.9	6.9
	poor	21	9.9	10.3	17.2
	fair	53	25.0	26.1	43.3
	good	68	32.1	33.5	76.8
	very good	47	22.2	23.2	100.0
	Total	203	95.8	100.0	
Missing	111.00	9	4.2		
Total		212	100.0		

How much would you say you know about Environmental problems?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	11	5.2	5.3	5.3
	poor	22	10.4	10.6	15.9
	fair	73	34.4	35.3	51.2
	good	74	34.9	35.7	87.0
	very good	27	12.7	13.0	100.0
	Total	207	97.6	100.0	
Missing	111.00	5	2.4		
Total		212	100.0		

How much would you say you know about Air pollution?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	9	4.2	4.3	4.3
	poor	22	10.4	10.6	15.0
	fair	69	32.5	33.3	48.3
	good	66	31.1	31.9	80.2
	very good	41	19.3	19.8	100.0
	Total	207	97.6	100.0	
Missing	111.00	5	2.4		
Total		212	100.0		

How much would you say you know about Energy issues?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	12	5.7	5.8	5.8
	poor	49	23.1	23.6	29.3
	fair	68	32.1	32.7	62.0
	good	57	26.9	27.4	89.4
	very good	22	10.4	10.6	100.0
	Total	208	98.1	100.0	
Missing	111.00	4	1.9		
Total		212	100.0		

Appendix L: Cross-Tabulation

1- Analysis of self-reported Attitudes cross-tabulation

Gender * When there is a choice, I always choose the product that contributes to the least amount of environmental damage. Crosstabulation

% within Gender

		When there is a choice, I always choose the product that contributes to the least amount of environmental damage.					Total
		Strogly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	
Gender	male	6.2%	6.2%	21.5%	20.0%	46.2%	100.0%
	female	2.8%	2.1%	25.0%	27.1%	43.1%	100.0%
Total		3.8%	3.3%	23.9%	24.9%	44.0%	100.0%

Gender * I have switched products for environmental reasons. Crosstabulation

% within Gender

		I have switched products for environmental reasons.					Total
		Strogly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	
Gender	male	10.6%	4.5%	40.9%	24.2%	19.7%	100.0%
	female	4.8%	4.1%	42.8%	24.1%	24.1%	100.0%
Total		6.6%	4.3%	42.2%	24.2%	22.7%	100.0%

Gender * If I understand the potential damage to the environment that some products can cause, I do not purchase those products. Crosstabulation

% within Gender

		If I understand the potential damage to the environment that some products can cause, I do not purchase those products.					Total
		Strogly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	
Gender	male	9.1%	4.5%	31.8%	27.3%	27.3%	100.0%
	female	4.9%	3.5%	23.6%	25.7%	42.4%	100.0%
Total		6.2%	3.8%	26.2%	26.2%	37.6%	100.0%

Gender * Whenever possible, I buy products packaged in reusable or recyclable containers. Crosstabulation

% within Gender

		Whenever possible, I buy products packaged in reusable or recyclable containers.					
		Strogly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Total
Gender	male	9.2%	9.2%	41.5%	12.3%	27.7%	100.0%
	female	2.8%	4.2%	31.9%	31.9%	29.2%	100.0%
Total		4.8%	5.7%	34.9%	25.8%	28.7%	100.0%

Gender * I have paid more for environmentally friendly products when there is a cheaper alternative. Crosstabulation

% within Gender

		I have paid more for environmentally friendly products when there is a cheaper alternative.					
		Strogly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Total
Gender	male	10.6%	10.6%	36.4%	22.7%	19.7%	100.0%
	female	7.6%	7.6%	44.1%	24.8%	15.9%	100.0%
Total		8.5%	8.5%	41.7%	24.2%	17.1%	100.0%

Education level * When there is a choice, I always choose the product that contributes to the least amount of environmental damage. Crosstabulation

% within Education level

		When there is a choice, I always choose the product that contributes to the least amount of environmental damage.					
		Strogly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Total
Education level	grade 10	2.5%	2.5%	18.8%	35.0%	41.3%	100.0%
	grade 11	5.7%	4.7%	28.3%	17.9%	43.4%	100.0%
	grade 12			21.7%	21.7%	56.5%	100.0%
Total		3.8%	3.3%	23.9%	24.9%	44.0%	100.0%

Education level * I have switched products for environmental reasons.

Crosstabulation

% within Education level

		I have switched products for environmental reasons.					Total
		Strogly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	
Education level	grade 10	6.2%	4.9%	43.2%	21.0%	24.7%	100.0%
	grade 11	7.5%	4.7%	43.0%	23.4%	21.5%	100.0%
	grade 12	4.3%		34.8%	39.1%	21.7%	100.0%
Total		6.6%	4.3%	42.2%	24.2%	22.7%	100.0%

Education level * If I understand the potential damage to the environment that some products can cause, I do not purchase those products. Crosstabulation

% within Education level

		If I understand the potential damage to the environment that some products can cause, I do not purchase those products.					Total
		Strogly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	
Education level	grade 10	5.1%	6.3%	27.8%	21.5%	39.2%	100.0%
	grade 11	7.4%	2.8%	25.9%	30.6%	33.3%	100.0%
	grade 12	4.3%		21.7%	21.7%	52.2%	100.0%
Total		6.2%	3.8%	26.2%	26.2%	37.6%	100.0%

Education level * Whenever possible, I buy products packaged in reusable or recyclable containers. Crosstabulation

% within Education level

		Whenever possible, I buy products packaged in reusable or recyclable containers.					Total
		Strogly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	
Education level	grade 10	8.9%	2.5%	38.0%	19.0%	31.6%	100.0%

	grade 11	2.8%	9.3%	31.8%	30.8%	25.2%	100.0%
	grade 12			39.1%	26.1%	34.8%	100.0%
Total		4.8%	5.7%	34.9%	25.8%	28.7%	100.0%

Education level * I have paid more for environmentally friendly products when there is a cheaper alternative. Crosstabulation

% within Education level

		I have paid more for environmentally friendly products when there is a cheaper alternative.					Total
		Strogly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	
Education level	grade 10	8.8%	5.0%	33.8%	27.5%	25.0%	100.0%
	grade 11	9.3%	12.0%	50.0%	15.7%	13.0%	100.0%
	grade 12	4.3%	4.3%	30.4%	52.2%	8.7%	100.0%
Total		8.5%	8.5%	41.7%	24.2%	17.1%	100.0%

2- Analysis of self-reported behaviours questions

Age * How often do you Recycle things such as newspapers, cans, and glass Crosstabulation

% within Age

		How often do you Recycle things such as newspapers, cans, and glass					Total
		Never	Rarely	Once a month	Once a week	Everyday	
Age	15	5.1%	54.4%	26.6%	10.1%	3.8%	100.0%
	16	3.7%	57.3%	11.0%	13.4%	14.6%	100.0%
	17	2.3%	76.7%	11.6%	9.3%		100.0%
	18		50.0%		50.0%		100.0%
Total		3.8%	60.0%	16.7%	12.4%	7.1%	100.0%

Age * How often do you do Re-use bags or jars Crosstabulation

% within Age

		How often do you do Re-use bags or jars					Total
		Never	Rarely	Once a month	Once a week	Everyday	
Age	15		35.0%	11.3%	16.3%	37.5%	100.0%
	16	4.9%	30.5%	14.6%	19.5%	30.5%	100.0%
	17	2.3%	30.2%	14.0%	16.3%	37.2%	100.0%
	18	16.7%		16.7%		66.7%	100.0%
Total		2.8%	31.3%	13.3%	17.1%	35.5%	100.0%

Age * How often do you do Turn off lights and electrical appliances when not in use or when you leave the room Crosstabulation

% within Age

		How often do you do Turn off lights and electrical appliances when not in use or when you leave the room					Total
		Never	Rarely	Once a month	Once a week	Everyday	
Age	15		9.9%	2.5%	3.7%	84.0%	100.0%
	16	2.4%	6.1%	4.9%	12.2%	74.4%	100.0%
	17			4.7%		95.3%	100.0%
	18					100.0%	100.0%
Total		0.9%	6.1%	3.8%	6.1%	83.0%	100.0%

Age * How often do you do Try not to drop litter Crosstabulation

% within Age

		How often do you do Try not to drop litter					Total
		Never	Rarely	Once a month	Once a week	Everyday	
Age	15	1.3%	5.0%	3.8%	3.8%	86.3%	100.0%
	16	3.7%	7.3%	2.4%	12.2%	74.4%	100.0%
	17		2.3%		7.0%	90.7%	100.0%
	18					100.0%	100.0%
Total		1.9%	5.2%	2.4%	7.6%	82.9%	100.0%

Age * How often do you do Bike or walk to School Crosstabulation

% within Age

		How often do you do Bike or walk to School					Total
		Never	Rarely	Once a month	Once a week	Everyday	
Age	15	8.8%	28.7%	6.3%	20.0%	36.3%	100.0%
	16	11.1%	37.0%	2.5%	22.2%	27.2%	100.0%
	17	16.3%	48.8%	7.0%	18.6%	9.3%	100.0%
	18		33.3%	33.3%	33.3%		100.0%
Total		11.0%	36.2%	5.7%	21.0%	26.2%	100.0%

Age * How often do you do Use the bus Crosstabulation

% within Age

		How often do you do Use the bus					Total
		Never	Rarely	Once a month	Once a week	Everyday	
Age	15	13.9%	32.9%	6.3%	2.5%	44.3%	100.0%
	16	11.1%	33.3%	2.5%	8.6%	44.4%	100.0%
	17	18.6%	41.9%			39.5%	100.0%
	18		33.3%			66.7%	100.0%
Total		13.4%	34.9%	3.3%	4.3%	44.0%	100.0%

Age * How often do you do Carpool with Others Crosstabulation

% within Age

		How often do you do Carpool with Others					Total
		Never	Rarely	Once a month	Once a week	Everyday	
Age	15	6.2%	27.2%	4.9%	14.8%	46.9%	100.0%
	16	7.8%	28.6%	3.9%	24.7%	35.1%	100.0%
	17	7.0%	25.6%	7.0%	18.6%	41.9%	100.0%
	18	16.7%	16.7%			66.7%	100.0%
Total		7.2%	27.1%	4.8%	18.8%	42.0%	100.0%

Age * How often do you do Purchase lamps, light-bulbs and appliances that are energy efficient Crosstabulation

% within Age

		How often do you do Purchase lamps, light-bulbs and appliances that are energy efficient					Total
		Never	Rarely	Occasionally	Very often	Always	

Age	15	13.8%	38.8%	28.7%	5.0%	13.8%	100.0%
	16	8.6%	28.4%	27.2%	14.8%	21.0%	100.0%
	17	9.3%	46.5%	23.3%	11.6%	9.3%	100.0%
	18		50.0%		16.7%	33.3%	100.0%
Total		10.5%	36.7%	26.2%	10.5%	16.2%	100.0%

**Age * How often do you do Run air conditioner less often in the summer
Crosstabulation**

% within Age

		How often do you do Run air conditioner less often in the summer					Total
		Never	Rarely	Once a month	Once a week	Everyday	
Age	15	9.9%	46.9%	7.4%	11.1%	24.7%	100.0%
	16	6.1%	39.0%	14.6%	12.2%	28.0%	100.0%
	17	14.0%	60.5%	7.0%	11.6%	7.0%	100.0%
	18		16.7%	33.3%	16.7%	33.3%	100.0%
Total		9.0%	45.8%	10.8%	11.8%	22.6%	100.0%

**Age * How often do you do Donate money annually to an environmental group
or organization Crosstabulation**

% within Age

		How often do you do Donate money annually to an environmental group or organization					Total
		Never	Rarely	Occasionally	Very often	Always	
Age	15	9.9%	25.9%	38.3%	16.0%	9.9%	100.0%
	16	7.4%	23.5%	33.3%	21.0%	14.8%	100.0%
	17	4.7%	44.2%	30.2%	14.0%	7.0%	100.0%
	18	16.7%		50.0%	16.7%	16.7%	100.0%
Total		8.1%	28.0%	35.1%	17.5%	11.4%	100.0%

**Age * How often do you do Buy organic foods on a regular basis
Crosstabulation**

% within Age

		How often do you do Buy organic foods on a regular basis					Total
		Never	Rarely	Once a month	Once a week	Everyday	
Age	15	7.9%	40.8%	14.5%	18.4%	18.4%	100.0%
	16	8.8%	32.5%	13.8%	23.8%	21.3%	100.0%
	17	9.8%	43.9%	19.5%	19.5%	7.3%	100.0%
	18		16.7%	33.3%	16.7%	33.3%	100.0%
Total		8.4%	37.4%	15.8%	20.7%	17.7%	100.0%

Age * How often do you do Buy dolphin friendly tuna Crosstabulation

% within Age

		How often do you do Buy dolphin friendly tuna					Total
		Never	Rarely	Occasionally	Very often	Always	
Age	15	15.4%	47.4%	15.4%	9.0%	12.8%	100.0%
	16	25.0%	40.0%	11.3%	16.3%	7.5%	100.0%
	17	26.2%	42.9%	21.4%		9.5%	100.0%
	18		66.7%	16.7%		16.7%	100.0%
Total		20.9%	44.2%	15.0%	9.7%	10.2%	100.0%

Age * How often do you do Buy locally-grown foods on a regular basis Crosstabulation

% within Age

		How often do you do Buy locally-grown foods on a regular basis					Total
		Never	Rarely	Occasionally	Very often	Always	
Age	15	5.0%	11.3%	26.3%	25.0%	32.5%	100.0%
	16	7.7%	21.8%	16.7%	25.6%	28.2%	100.0%
	17	4.7%	18.6%	23.3%	34.9%	18.6%	100.0%
	18		33.3%	16.7%	16.7%	33.3%	100.0%
Total		5.8%	17.4%	21.7%	27.1%	28.0%	100.0%

Age * How often do you participate in environmental protection activities e.g. Littering, planting, recycling? Crosstabulation

% within Age

		How often do you participate in environmental protection activities e.g. Littering, planting, recycling?					Total
		Never	Rarely	Once a month	Once a week	Everyday	
Age	15	39.5%	25.9%	22.2%	4.9%	7.4%	100.0%
	16	46.9%	17.3%	18.5%	11.1%	6.2%	100.0%
	17	72.1%	7.0%	11.6%	4.7%	4.7%	100.0%
	18	33.3%	16.7%	16.7%		33.3%	100.0%
Total		48.8%	18.5%	18.5%	7.1%	7.1%	100.0%

Age * How often do you watch TV programs or read material about the environment? Crosstabulation

% within Age

		How often do you watch TV programs or read material about the environment?					Total
		Never	Rarely	Once a month	Once a week	Everyday	
Age	15	25.3%	13.9%	13.9%	25.3%	21.5%	100.0%
	16	38.3%	4.9%	14.8%	18.5%	23.5%	100.0%
	17	16.3%	14.0%	18.6%	37.2%	14.0%	100.0%
	18	16.7%		33.3%	33.3%	16.7%	100.0%
Total		28.2%	10.0%	15.8%	25.4%	20.6%	100.0%

Self-reported Environmental Knowledge cross-tabulation

Gender * I consider myself highly knowledgeable about Environmental issues Crosstabulation

% within Gender

		I consider myself highly knowledgeable about Environmental issues					Total
		Strogly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	
Gender	male	7.8%	1.6%	20.3%	40.6%	29.7%	100.0%
	female	0.7%	6.4%	43.6%	35.7%	13.6%	100.0%
Total		2.9%	4.9%	36.3%	37.3%	18.6%	100.0%

% within Gender

		How much would you say you know about Environmental problems?					Total
		very poor	poor	fair	good	very good	
Gender	male	9.4%	4.7%	26.6%	34.4%	25.0%	100.0%
	female	3.5%	13.3%	39.2%	36.4%	7.7%	100.0%
Total		5.3%	10.6%	35.3%	35.7%	13.0%	100.0%

Gender * How much would you say you know about Air pollution? Crosstabulation

% within Gender

		How much would you say you know about Air pollution?					Total
		very poor	poor	fair	good	very good	
Gender	male	3.1%	15.6%	28.1%	25.0%	28.1%	100.0%
	female	4.9%	8.4%	35.7%	35.0%	16.1%	100.0%
Total		4.3%	10.6%	33.3%	31.9%	19.8%	100.0%

Gender * How much would you say you know about Energy issues?

Crosstabulation

% within Gender

		How much would you say you know about Energy issues?					Total
		very poor	poor	fair	good	very good	
Gender	male	4.7%	17.2%	28.1%	29.7%	20.3%	100.0%
	female	6.3%	26.4%	34.7%	26.4%	6.3%	100.0%
Total		5.8%	23.6%	32.7%	27.4%	10.6%	100.0%

Gender * How much would you say you know about Water quality?

Crosstabulation

% within Gender

		How much would you say you know about Water quality?					Total
		very poor	poor	fair	good	very good	
Gender	male	11.5%	6.6%	23.0%	29.5%	29.5%	100.0%
	female	4.9%	12.0%	27.5%	35.2%	20.4%	100.0%
Total		6.9%	10.3%	26.1%	33.5%	23.2%	100.0%

Education level * I consider myself highly knowledgeable about

Environmental issues Crosstabulation

% within Education level

		I consider myself highly knowledgeable about Environmental issues					Total
		Strogly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	
Education level	grade 10	2.5%	7.6%	32.9%	43.0%	13.9%	100.0%
	grade 11	3.9%	2.9%	35.3%	35.3%	22.5%	100.0%
	grade 12		4.3%	52.2%	26.1%	17.4%	100.0%
Total		2.9%	4.9%	36.3%	37.3%	18.6%	100.0%

Education level * How much would you say you know about Environmental problems? Crosstabulation

% within Education level

		How much would you say you know about Environmental problems?					Total
		very poor	poor	fair	good	very good	
Education level	grade 10	6.3%	6.3%	35.0%	40.0%	12.5%	100.0%
	grade 11	5.8%	15.4%	31.7%	31.7%	15.4%	100.0%
	grade 12		4.3%	52.2%	39.1%	4.3%	100.0%
Total		5.3%	10.6%	35.3%	35.7%	13.0%	100.0%

Education level * How much would you say you know about Air pollution? Crosstabulation

% within Education level

		How much would you say you know about Air pollution?					Total
		very poor	poor	fair	good	very good	
Education level	grade 10	5.0%	3.8%	31.3%	35.0%	25.0%	100.0%
	grade 11	4.8%	18.3%	34.6%	26.9%	15.4%	100.0%
	grade 12			34.8%	43.5%	21.7%	100.0%
Total		4.3%	10.6%	33.3%	31.9%	19.8%	100.0%

Education level * How much would you say you know about Energy issues? Crosstabulation

% within Education level

		How much would you say you know about Energy issues?					Total
		very poor	poor	fair	good	very good	
Education level	grade 10	5.0%	23.8%	35.0%	23.8%	12.5%	100.0%
	grade 11	5.7%	22.9%	29.5%	30.5%	11.4%	100.0%
	grade 12	8.7%	26.1%	39.1%	26.1%		100.0%
Total		5.8%	23.6%	32.7%	27.4%	10.6%	100.0%

Education level * How much would you say you know about Water quality? Crosstabulation

% within Education level

		How much would you say you know about Water quality?					Total
		very poor	poor	fair	good	very good	
Education level	grade 10	10.4%	2.6%	32.5%	28.6%	26.0%	100.0%
	grade 11	5.8%	14.6%	22.3%	34.0%	23.3%	100.0%
	grade 12		17.4%	21.7%	47.8%	13.0%	100.0%
Total		6.9%	10.3%	26.1%	33.5%	23.2%	100.0%

Appendix M: Topics covering environmental aspects of Oman school's curriculum

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
Grade	Water	Aflaj	The eyes	Wells and valleys in my	Rain in Oman	Earthquakes
4	desalination		Definition	country		
		Definition of			The total rainfall falls on the	Concept of earthquakes
	How to get	Aflaj	Types of eyes	Season of runoff valleys	Sultanate annually.	
	water					Causes of earthquakes
		The uses of	Uses of the eyes	Benefits of building dams	The difference in rainfall	
	Oman's efforts	Aflaj		to reserve rainwater	seasons in the Sultanate	Effects of earthquakes
	to address the		The importance of			
	problem of	Water sources	preserving eyes and		Maintenance of water	Degree of severity of
	water shortage		springs			earthquakes
		The most				
		famous Aflaj in				

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
Grade 4	The largest desalination plants in Oman Type of water	the Sultanate of Oman Oman's efforts to maintain aflaj				
Grade 5	Agriculture Agricultural pollution Agroforestry	Air quality Acid rain Air pollution	Climate change Global warming Greenhouse effect	Ecosystems Coastal ecosystems Coral reefs		

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
	Animal husbandry	Asthma Criteria pollutants	Urban heat island effect	Deserts Forests Grasslands Mountains Oceans Rainforests Rivers, Lakes and Stream s		
	Aquaculture	Fossil fuels				
	Biodynamic farming	Photochemical smog				
	Biotechnology	Indoor Air				
	Composting	Quality				

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
	Genetically modified foods	Industrial pollution		Wetlands		
	Herbicides	Ozone depletion				
	Organic farming	Pollution prevention				
	Permaculture	Transport and the				
	Pesticides	environment				

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
	Sustainable agriculture					
Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
Grade	Energy	Environmental	Environmental	Environmental ethics	Environmental	Forests
7	Alternative fuels	disasters Chemical Spills	economics Economic development	Deep ecology Ecofeminism	legislation and environmental policy Environmental justice	Agroforestry
	Biomass	Floods	Free trade	Religion and	Environmental politics	Deforestation
	Energy conservation	Hurricanes	Globalisation	environmentalism	Environmental regulation	Forest management
						Old growth

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
	Efficient energy use	Landslides	Environmental education	Social Ecology		Rainforests
	Fossil fuel	Monsoons	Environmental studies			Reforestation
	Fuel cells	Nuclear and radiation accidents	Outdoor Education			Sustainable forestry
	Geothermal energy	Oil Spills				
	Hydroelectric energy	Tornadoes				
		Wildfires				

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
	Nuclear power					
	Solar energy					
	Wind energy					
Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
Grade	Ground	Habitat	Human health	Human health-Cont.		
9	pollution	conservation	Asbestos	Light pollution		
	Brownfields	Marine				
		conservation	Asthma	Mercury poisoning		
	Industrial					
	pollution	National parks	Cancer			

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
	Landfills	Pollution	Chlorine	Multiple chemical sensitivity		
	Pollution prevention	Public Lands	Dioxin	Noise pollution		
	Resource extraction	Resource extraction	Drinking water	Occupational safety and health		
		Wilderness	Fluoride	Organochlorines		
	Soil quality	areas	Food quality	Poverty		
			Genetically modified foods	Radiation		

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
			Lead	Radon		
				Toxins		
Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
Grade	Natural	Oceans	Outdoor	Population	Sciences	Social
10	history	Aquaculture	recreation	Overconsumption	Atmospheric sciences	sciences and humanities
	Environmental		Biking			Archaeology
	history	Beaches		Overpopulation	Biology	
			Bird watching		Biotechnology	Ethnic diversity
	Prehistory		Hiking/Backpacking		Botany	

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
		Coastal ecosystems	Snow sports/Ice sports		Chemistry	Indigenous cultures
		Coral Reefs			Ecology	
					Geography	World cultures
					Geology	
			Water sports		Meteorology	
		Fisheries			Oceanography	
					Ornithology	
		Marine biology			Palaeontology	
		Oceanography				

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
Grade	Sustainable	Sustainable	Sustainable living	Transportation	Vegetarianism	Waste management
11	business	development	Consumerism	Alternative fuel vehicles	Fruitarianism	Bioremediation
	Alternative fuels	Economic development	Green building	Bicycles	Veganism	Composting
	Corporate accountability	Sustainable agriculture	Home maintenance	Mass transit	Vegetarianism	Environmental remediation
	Economic development	Sustainable forestry	Organic gardening	Telecommuting	Lacto vegetarianism	Hazardous and toxic waste
	Ecotourism	Sustainable technology	Social investing	Urban issues		Landfills
			Sustainable transport	Light pollution		
				Noise pollution		

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
	Energy conservation			Sprawl		Nuclear Waste
	Green building			Traffic		Recycling
	Pollution prevention			Urban heat island effect		
	Social investing			Urban planning		
	Sustainable technology					

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
	Waste reduction Water conservation					
Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
Grade	Water	Wildlife				
12	quality	Biodiversity				
	Beaches					
		Conservation				
	Drinking	biology				
	water					
		Endangered				
	Fishing	species				
	Industrial	Fauna				
	pollution					
		Flora				

Level	Topic-1	Topic-2	Topic-3	Topic-4	Topic-5	Topic-6
	Pollution prevention	Invasive species				
	Water conservation	Native plants				
		Wildflowers				
	Water pollution	Wildlife conservation				
	Water treatment	Wildlife sanctuaries				
	Watersheds					

Appendix N: Step One: categorising students' self-reported environmental attitudes and behaviours in two main categories: Positive and negative responses

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
1. Do you participate in environmental protection activities? Why? Give examples.	<p>To protect the environment: S1 and S7 “This was a voluntary work to help the environment.”</p> <p>Self-motivation: S4 and S5 “For individuals, it is important for protecting our health.”</p> <p>“Because we live inside this environment. If this environment is good, that means our life will be good. If the environment is bad, our life will be bad.”</p> <p>Spreading awareness: S8 “This will help in spreading awareness amongst the community.”</p>	<p>Lack of awareness: S11 “currently we don't have many lectures about the environment. The person himself search about such subject in the interest.”</p> <p>Lack of environmental societies' promotions: S2, S3 and S11 “I don't know about the societies that work on protecting the environment.”</p> <p>“I don't know an organisation that helps us to do this.”</p>

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
		“This could be a result of the non-existence or unavailability of the specialised organisations.”
2. Do you recycle things such as newspapers, cans, and glass? Why?	<p>The availability of facilities: S1 “Yes, particularly recently, there is a company called Beaa'h which put boxes to be used for recycling. These boxes exist in some areas but some areas not.”</p> <p>S12 “Yes, sometimes when I see recycling bins, I throw the items in it.”</p>	<p>Not interested: S2 “I also don't have the interest to do this.”</p> <p>No time: S5 “No, I don't have enough time. There are specialised organisations who carry out this job.”</p> <p>Lack of availability: S8 “No, I take it to the recycling boxes. These boxes are not near to my house.”</p>

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
	<p>To protect the environment: S3, S4, S11 “But I put the items in the recycling boxes. This is good for our environment as it protects it and prevents diseases and insects.”</p> <p>“Of course, it is good for decreasing the volume of garbage so that it protects our environment.”</p> <p>“This will protect the environment.”</p> <p>Self-motivation: S4 “to protect our health.”</p> <p>Save resources: S13 “The recycling has many benefits to the environment; for example, it saves money.' and gives chances to the use of such recycled materials.”</p> <p>S10 and S11 “This will save the resources and materials.”</p>	

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
3. Why do you re-use bags or jar?	<p>To protect the environment: S1 “I think this is good for the environment to decrease the volume of pollutants.”</p> <p>S4 “Such bags are damaging the environment so that it is better to reuse them once again.”</p> <p>S5 “Yes, we re-use them because they are harmful to the environment while we can benefit from them.”</p> <p>S10 “It is good to help the cleanness of the environment.”</p> <p>S11 “this is good behaviour as this will decrease the waste. We use such materials because they are not decayed easily in the environment.”</p> <p>S12 “Sometimes I use it as a garbage bag. This is good to mitigate pollution.”</p>	<p>Unhealthy: S3 “No, I don't recommend the re-use, because this could be unhealthy.”</p>

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
	<p>S13 “Yes, I do this. I know that decayed bags are very harmful to the environment.”</p> <p>To save money: S2 “This also saves money.”</p> <p>Self-motivation: S8 “It could be used for other objectives. I can put other items inside it. I can keep my personal items in it.”</p> <p>S9 “Yes, as I told you I made packs for planting. I like to do this. I only like this matter as a hobby.”</p>	
4. Why do you turn off lights and electrical appliances when not in use or	<p>To save money: S1, S10, and S12 “This is awareness with regard to saving money.”</p> <p>S3 “This saves money.”</p> <p>S4 “That saves money.”</p>	

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
when you leave the room?	<p>To save resources: S1, S10, S12, S13 “to save the electric resources.”</p> <p>S2, S8 “To save power. Electricity uses petrol so that we save our resources and power.”</p> <p>S4, S5 and S6 “Of course, this is for saving energy.”</p> <p>Avoid the risks: S2 “It helps in saving the children from the danger of electricity.”</p> <p>S4 “This also avoid the danger of fire and electric shorts.”</p> <p>Self- motivation: S3 “It also protects us from pollution. This is also reflected in the health of man.”</p> <p>S3 “this can cause problems to our health.”</p>	

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
	Bad emissions: S5 and S6, S11 “This also gives bad emission that harms human health and the environment.”	
5. Why you try not to drop litter? What motivates you not to drop litter? What are the benefits of not dropping litter?	<p>To protect the environment: S1, S10 and S12 “this saves the environment from the pollutants. This also preserves our nature.”</p> <p>S2, S7, and S9 “This helps for a clean environment and prevent the diseases. The garbage can cause an increase in insects, which result in diseases.”</p> <p>Environmentally: S3, S4, S11, S12, S13 “this can cause problems for our environment. I am throwing the garbage in specific place help to solve the environmental problems and pollution.”</p>	

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
	<p>Easy to collect the litter: S3, S4, S5, S6, S7, S10, S11 “If we throw it in the specified place, the specialised companies will collect them and send them to the landfill or could be recycled.”</p> <p>Self-motivation: S3, S8 “This helps to live in a good and healthy place.”</p> <p>My religion: S8 “My religion also encourages us to protect the environment and keep our nature clean.”</p> <p>Ethics and values: S11 “This is our ethics. It comes from our values and good behaviour.”</p>	
6. Do you walk to school? Why?	The distance: S1, S4 “the school is near, it takes 15–20 minutes’ walking.”	Long distance: S2, S6, S7, S8, S10, S11, S12, S13 “No, because I live far from the school.”

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
	<p>Financial issues: S4 “In the past, I was walking because of financial conditions.”</p> <p>S5 “This also saves money and saves energy.”</p> <p>To protect the environment: S5 “It also saves the environment from the harmful emission.”</p>	<p>S3 “this is attributed to the far distance from school.”</p> <p>The weather: S6, S11, S12, and S13 “the weather is very hot. I can't walk to school.”</p> <p>Private car: S9 “No, because I came with my private family car.”</p>
<p>7. Why do you carpool with others?</p> <p>What are the benefits of carpooling with others?</p>	<p>Self-motivation: S1, S8, S10 and S11 “This could help in creating communication amongst the family members and with friends.”</p> <p>To protect the environment: S1, S8, and S9 “This helps the environment as it helps in decreasing emissions from the vehicles.”</p>	

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
	<p>S3, S4, S6, S7 “It also helps the environment by decreasing the smokes and emission.”</p> <p>To save money: S3, S7, S8, and S12 “This is good to decrease the cost of private cars.”</p> <p>To save energy: S5 “This helps to save energy and saves our national wealth that depends on petrol.”</p> <p>Traffic reasons: S13 “It also mitigates traffic jams.”</p>	
8. Do you use the bus? Why? What are the benefits of using a public bus?	<p>To save money: S3, S9, S10 “It is beneficial to save money.”</p> <p>To protect the environment: “3 ‘It also protects the environment by decreasing the number of cars.”</p>	<p>Not common: S1 “No, in Oman it is not generally used. I knew there is a bus project (Mowasalat), but I don't have a specific idea about it. This could be attributed to the quality of the service. For me, I am still in school. I don't know a lot about this matter.”</p>

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
		<p>Bus services' quality: S1, S6, S7 and S13 “This also could be attributed to the far places of the bus stops. It is generally used by expatriates. I used it outside Oman in the USA. Most of my transportations were done by bus. In Oman, you have to walk a long distance to reach the bus stop. It is good to use the bus, but the problem is unavailability in all the areas. It should cover all the residential areas.”</p> <p>S3 “Sometimes I use public transportation, but this rarely happens because I have to walk a long distance to reach the bus. It is not available everywhere.”</p>

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
		No: S2, S4, S5, S8, S11, S12 “No, I don't use it. I didn't try it. I use a private car.”
9. Why do you run the air conditioner more often in the summer?	<p>Weather: S1, S7, S8, S9, S11 ‘The weather is the main factor for using the conditioner.’</p> <p>S2 “I use it more in the summer because of the climate of Oman. It is hot during the summer.”</p> <p>S3, S5 “I use it more in the summer even if the cost is higher. It is very hot in the summer, so it impossible not to use the conditioner.”</p>	<p>No: S12, S13 “I run the air conditioner less to protect my health.”</p> <p>S13 “it harms my bones.”</p>
10. Do you buy organic food? Why? If you have enough money will you buy?	Yes: S4, S8 “I will do because this is beneficial for our health.”	<p>Lack of awareness: S1, S10, S11 “I don't know really what is organic.”</p> <p>S2 “Sorry I don’t understand.”</p>

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
		<p>S3 “I am not really concerned about this matter. This is attributed to the lack of it in our area or the lack of awareness about the benefits.”</p> <p>No: S5, S12 “I don't buy organic food.”</p>
11. Do you buy dolphin friendly tuna? Why?	<p>Yes: S4, S6, S9 “I use them. This is a replacement for the other type of fish.”</p> <p>Yes: S5 “Yes, this is the only available type in Oman. I like to eat it because I am not allergic to it.”</p>	<p>Dislike: S12 “No, I don't like tuna.”</p> <p>Lack of awareness: S3, S11 “Frankly I don't know about it. We use it very little at home.”</p>
12. What makes you donate money to environmental causes/organisations?	<p>For the Environment: S1, S5, S8, S12, S13 “Of course, I want to help my country, and I want to save the environment. I want to see cleanness everywhere. If I go to a place that is full pollutions, this will be bad and make me motivated to pay for these organisations.”</p>	

Behaviours Questions	Participants' Answers – Positive	Participants' Answers – Negative
	<p>S3, S4, S7 “Yes, I will contribute because this is useful for our environment and it is also good for our health and preserves the nature and the beauty of our country.”</p> <p>The amount of money: S9 “I will donate if the amount is a small sum of money.”</p> <p>Self-motivation: S11 “If I know that their work is influential to my life and environment, I will donate to benefit myself and benefit my community.”</p>	

Appendix O: Positive reasons for the interviewee's environmentally unfriendly behaviours

Behaviours Questions	Overarching THEMES	Major categories	Sample of coded texts
1. Do you participate in environmental protection activities? Why? Give examples?	To protect the environment	The environment	S1 and S7 “This was a voluntary work to help the environment.”
	Self-motivation	Health Good-Life	S4 and S5 “For individuals it is important for protecting our health.” “Because we live inside this environment. If this environment is good, that means our life will be good. If the environment is bad, our life will be bad.”

Behaviours Questions	Overarching THEMES	Major categories	Sample of coded texts
	Spreading Awareness	Awareness	S8 ‘This will help in spreading the awareness amongst the community.’
2. Do you recycle things such as newspapers, cans, and glass? Why?	The availability of facilities	Facilities	S1 “Yes, particularly recently, there is a company called Beaa'h which put boxes to be used for recycling. These boxes exist in some areas but some areas not.”

Behaviours Questions	Overarching THEMES	Major categories	Sample of coded texts
	To protect the environment	The environment	S3, S4, and S11 “Of course, it is good for decreasing the volume of garbage so that it protects our environment.”
	Self-Motivation	Health	S4 “to protect our health.”
	Financial issues	Save money	S13 “The recycling has many benefits to the environment; for example, it saves money.”
	Save resources	Natural resources Materials	S10 and S11 ‘This will save the resources and materials.’

Behaviours Questions	Overarching THEMES	Major categories	Sample of coded texts
3. Why do you re-use bags or jars?	To protect the environment	The environment Decrease in pollution	S1 “I think this is good for the environment to decrease the volume of pollutants.”
	Financial issues	Save money	S2 “This also saves money.”
	Self-motivation	Hobby Good to use	S8 “It could be used for other objectives. I can put other items inside it. I can keep my personal items in it.” S9 “Yes, as I told you I made packs for planting. I like to do this. I only like this matter as a hobby.”

Behaviours Questions	Overarching THEMES	Major categories	Sample of coded texts
4. Why do you turn off lights and electrical appliances when not in use or when you leave the room?	Financial issues	Save money	S1, S10, and S12 “This is awareness with regard to saving money.”
	To save resources	Save power Save the natural resources	S1, S10, S12, S13 “to save electric resources.”
	Avoid the risks	Fires	S2 “It helps in saving the children from the danger of electricity.” S4 “This also avoid the danger of fire and electric shorts.”
	Self- motivation	Human health	S3 “It also protects us from pollution. This is also reflected in the health of man. This can cause a problem for our health.”

Behaviours Questions	Overarching THEMES	Major categories	Sample of coded texts
	Bad emission	Pollution The environment Human health	S5, S6, S11 “This also gives bad emission that harms human health and the environment.”
5. Why do you try not to drop litter? What motivates you not to drop litter? What are the benefits of not dropping litter?	To protect the environment	Pollution Diseases	S1, S10, and S12 “this saves the environment from the pollutants. This also preserves our nature.’ S2, S7, and S9 “This helps for a clean environment and prevent the diseases. The garbage can cause an increase in insects, which result in diseases.”
	Environment	Save environment	S3, S4, S11, S12, S13 “this can cause problems for our environment. I am throwing

Behaviours Questions	Overarching THEMES	Major categories	Sample of coded texts
			the garbage in specific place help to solve the environmental problems and pollution.”
	Easy to collect the litter	Garbage collection	S3, S4, S5, S6, S7, S10, S11 “If we throw it in the specified place, the specialised companies will collect them and send them to the landfill or could be recycled.”
	Self-motivation	Healthy life	S3, S8 “This helps to live in a good and healthy place.”
	My Religion	Encouragement	“My religion also encourages us to protect the environment and keep our nature clean.”
	Ethics and Values	Ethics Values	S11 “This is our ethics. It comes from our values and good behaviour.”

Behaviours Questions	Overarching THEMES	Major categories	Sample of coded texts
6. Do you walk to school? Why?	The distance	Long distance	S1, S4 “the school is not near it takes 15-20 minutes walking.”
	Financial issues	Save money Save energy	S4 “In the past, I was walking because of financial conditions.” S5 “This also saves money and saves energy.”
	To protect the environment	The environment	S5 “It also saves the environment from the harmful emission.”
7. Why do you carpool with others? What are	Self-motivation	Communication	S1, S8, S10, S11 “This could help in creating communication amongst the family members and with friends.”

Behaviours Questions	Overarching THEMES	Major categories	Sample of coded texts
the benefits of carpooling with others?	To protect the environment	The environment Decrease emissions	S1, S8, S9 “This helps the environment as it helps in decreasing emissions from the vehicles.” S3, S4, S6, S7 “It also helps the environment by decreasing the smokes and emission.”
	Financial issues	Save money	S3, S7, S8, S12 “This is good to decrease the cost of private cars.”
	To save energy	Save petrol	S5 “This helps to save energy and saves our national wealth that depends on petrol.”
	Traffic reasons	Road traffic	S13 “It also mitigates the traffic jams.”

Behaviours Questions	Overarching THEMES	Major categories	Sample of coded texts
8. Do you use the bus? Why? What are the benefits of using a public bus?	Financial issues To protect the environment.	Save money Decrease using cars	S3, S9, S10 “It is beneficial to save money.” S3 “it also protects the environment by decreasing the number of cars.”
9. Why do you run the air conditioner more often in the summer?	Weather	Hot temperature	S1, S7, S8, S9, S11 “The weather is the main factor for using the conditioner.” S2 “I use it more in the summer because of the climate of Oman.”
10. Do you buy organic food? Why? If you	Yes	Health	S4, S8 “I will do because this is beneficial for our health.”

Behaviours Questions	Overarching THEMES	Major categories	Sample of coded texts
have enough money will you buy?			
11. Do you buy dolphin friendly tuna? Why?	Yes	Interested	S4, S6, S9 “I use them. This is a replacement for the other type of fish.” S5 “Yes, this is the only available type in Oman. I like to eat it because I am not allergic to it.”
12. What makes you donate money to environmental causes/organisations?	For the Environment:	Cleanness Decrease in pollution	S1, S5, S8, S12, S13 “Of course, I want to help my country, and I want to save the environment. I want to see cleanness everywhere. If I go to a place that is full

Behaviours Questions	Overarching THEMES	Major categories	Sample of coded texts
			pollutions, this will be bad and make me motivated to pay for these organisations.”
	The amount of money	Small amounts	S9 “I will donate if the amount is a small sum of money.”
	Self-motivation	Community Myself The environment	S11”If I know that their work is influential to my life and environment, I will donate to benefit myself and benefit my community.”

Appendix P: The main shared themes to the negative reasons for the interviewees' environmentally unfriendly behaviours

Behaviours Questions	Overarching Themes	Major categories	Sample of coded texts
1. Do you participate in environmental protection activities? Why? Give examples?	No	Lack of awareness Lack of environmental societies' promotions	S11 "currently we don't have many lectures about the environment. The person himself search about such subject in the interest." S2, S3, S11 "I don't know about the societies that work on protecting the environment." "I don't know an organisation that helps us to do this." "This could be a result of the non-existence or unavailability of the specialised organisations."
2. Do you recycle things such as	No	Not Interested No time	S2 "I also don't have the interest to do this."

Behaviours Questions	Overarching Themes	Major categories	Sample of coded texts
newspapers, cans, and glass? Why?		Lack of availability No	S5 “No, I don't have enough time. There are specialised organisations who carry out this job.” S8 “No, I take it to the recycling boxes. These boxes are not near to my house.” S10 “I usually throw the unwanted items in the waste bins. I threw them in the specified places.”
3. Why do you re-use bags or jars?	Health issues	Unhealthy	S3 ”No, I don't recommend the re-use, because this could be unhealthy”
6. Do you walk to school? Why?	No	Far distance	S2, S6, S7, S8, S10, S11, S12, S13 “No, because I live far from the school.” S3 “this is attributed to the far distance from school.”

Behaviours Questions	Overarching Themes	Major categories	Sample of coded texts
		<p>The weather</p> <p>Private car</p>	<p>S6, S11, S12, S13 “the weather is very hot. I can't walk to school.”</p> <p>S9 “No, because I came with my private family car.”</p>
8. Do you use the bus? Why? What are the benefits of using a public bus?	No:	<p>Not common</p> <p>Bus services quality</p>	<p>S1 “No, in Oman it is not generally used. I knew there is a bus project (Mowasalat), but I don't have a specific idea about it. This could be attributed to the quality of the service. For me, I am still in school. I don't know a lot about this matter.”</p> <p>S1, S6, S7, S13 “This also could be attributed to the far places of the bus stops. It is generally used by expatriates. I used it outside Oman in the USA. Most of my</p>

Behaviours Questions	Overarching Themes	Major categories	Sample of coded texts
		Private car	<p>transportations were done by bus. In Oman, you must walk a long distance to reach the bus stop. It is good to use the bus, but the problem is unavailability in all the areas. It should cover all the residential areas.”</p> <p>S3 “Sometimes I use public transportation, but this rarely happens because I have to walk a long distance to reach the bus. It is not available everywhere.”</p> <p>S2, S4, S5, S8, S11, S12 ‘No, I don't use it. I didn't try it. I use a private car’.</p>
9. Why do you run the air conditioner	No	Health issues	<p>S12, S13 “I run the air conditioner less to protect my health”</p> <p>S13 “it harms my bones.”</p>

Behaviours Questions	Overarching Themes	Major categories	Sample of coded texts
more often in the summer?			
10. Do you buy organic food? Why? If you have enough money will you buy?	No	Lack of awareness	S1, S10, S11 'I don't know really what is organic.' S2 "Sorry I don't understand". S3 "I am not really concerned about this matter. This is attributed to the lack of it in our area or the lack of awareness about the benefits."
11. Do you buy dolphin friendly tuna? Why?	No	I don't like Lack of awareness	S12 "No, I don't like tuna." S3, S11 "Frankly I don't know about it."

**Appendix Q: Winners of the Sultan Qaboos Prize for Environmental
Preservation**

Year	Name of the winner	Purpose/Area of improvement	Country
1991	The Instituto de Ecología A.C. of Mexico	Contributions to scientific research and training in the field of natural resources.	Mexico
1993	Professor Jan Jeník, The Czech Republic	His career is marked by his professional competence, dedication, and personal integrity, which have given him intentional renown and respect.	Czech Republic
1995	Lake Malawi National Park	Lake Malawi has clear and deep waters with hundreds of mostly endemic fish species.	Malawi
1997	Department of Environmental Sciences of Egypt and Forest Department of Sri Lanka	Mark Ashton for their activities in forest conservation, sustainable management of natural forests.	Sri Lanka and Egypt
1999	Charles Darwin Foundation for the Galapagos Islands	The Research Station team work side by side with the Galapagos National Park Service and together they are tackling critical issues, such as the risks and impacts of alien species, intensive fishing and the effects of increases in both tourism and resident population.	Galapagos (Ecuador)

Year	Name of the winner	Purpose/Area of improvement	Country
2001	Association Tchadienne des Volontaires pour la Protection de l'Environnement	The Association has planted almost 20,000 trees across the country, has produced, and distributed 70,000 seedlings to the local population. Traditional technologies are used in combating desertification and in minimising the effects of drought.	Chad
2003	Centro de Ecología, Venezuela and Mr. Peter Johan Schei, Norway	Mr. Schei's role as a facilitator in the dialogue between developed and developing countries in the international environmental arena.	Norway and Venezuela
2005	The Great Barrier Reef Marine Park Authority (Australia) and to Dr. Ernesto C. Enkerlin-Hoeflich (Mexico)	GBRMPA is responsible for the care and protection of the Great Barrier Reef Marine Park.	Australia and Mexico
2007	Institute of Biodiversity Conservation and Dr. Julius Oszlányi	The Institute of Biodiversity Conservation (IBC) is recognized for its efforts to establish effective systems ensuring the conservation and sustainable use of Ethiopia's biodiversity	Ethiopia and Slovakia
2009	Autonomous Authority for National Parks	It works to conserve Spain's natural heritage through efforts to save endangered species and their habitats, eliminate non-native species, restore	Spain

Year	Name of the winner	Purpose/Area of improvement	Country
		degraded areas and monitor air and water quality, in addition to supporting environmental education and training.	
2011	Forestry Research Institute of Nigeria	For their pioneering work in forest management and preservation in the country.	Nigeria
2013	The State Forests National Forest Holding of Poland and South Africa's Endangered Wildlife Trust	Ensuring the sustainable management of forests while raising public awareness of environmental concerns and the need for ecological conservation.	Poland and South Africa
2015	Fabio A. Kalesnik, Horacio Sirolli and Luciano Iribarren of the Wetlands Ecology Research Group of the University of Buenos Aires	Achievements in support of environmental preservation.	Argentina